UNIVERSITY OF ARIZONA
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A HISTORY OF ARCHITECTURE

1 St. Paul's Cathedral, London (1675–1710). The West Front

Sir Christopher Wren, architect

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1950

A HISTORY OF ARCHITECTURE

By

H. Heathcote Statham

Revised by

Hugh Braun, F.S.A., F.R.I.B.A.

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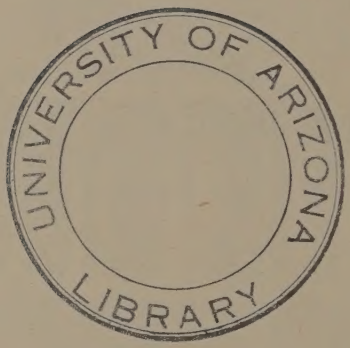

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PREFACE

THE leisured era represented by Victorian England was a period of intensive research into historical architecture. Architects and scholars combined with enthusiastic dilettantes to order and classify ancient buildings into "styles." It was the hey-day of stylistic building: Egyptian Halls, Pantheons, Doric portals, and Gothic railway stations were scattered recklessly about the English scene. There were no rules of architectural design other than those discoverable through reference to published works illustrating the features of whatever style might be selected by the architect.

Towards the end of the century, many such books came to be written. Some of these were treatises upon individual styles; others were general works. The dictums of the Late-Victorian giants of architectural literature have come to be accepted, and even to-day are faithfully echoed by their successors. Very little new research has been undertaken or its results published; thus the work under revision, although written forty years ago, is still a standard history of architecture.

The professional man having at most periods been too busy creating architecture to be able to spare the time in which to concern himself with past achievements, much of the history of architecture has perforce been compiled by the amateur, more concerned, perhaps, with æsthetic variations than structural problems. This is, however, of little consequence at the present time; for nowadays the study of historical architecture is a matter for amateur enjoyment rather than professional instruction.

The present reviser, himself a professional architect with a taste for historical research, has experienced some difficulty in repressing his own views, based upon more recent examination of the problems concerned. He is, however, deeply conscious of the true spirit which created this enthusiastic history of the monuments of great days long past. Some of the now universally accepted errors have, however, been eliminated, and the later chapters expanded in order to revive Statham's great History in a form in which it may still be read, forty years after its devoted and laborious compilation, with profit and enjoyment.

H. B.

1949.

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Fig. 558 is reproduced from Professor Pearce's *Eighteenth Century Architecture of South Africa.*

INTRODUCTION

THE writer upon Architectural History would aim to produce upon the mind of his reader an effect which may best be illustrated by a simple parallel. An intelligent child, if he were able to express in words his first impressions of a great oak, might say that he had seen with wonder a wide leafy canopy balanced upon a comparatively slender stem. The sense of wonder having kindled a thirst for further knowledge, he might then discover that beneath the soil there are strong spreading roots which anchor down the structure and resist the forces that would overturn the tree. Further advanced research would reveal the fact that these same roots actually absorb nourishment from the soil and circulate it throughout the whole tree, to maintain its life and the evidence thereof in swelling trunk, growing branch, shooting twig and leaf, and seed for oaks to come. The bewildering mystery thus becomes a wonder largely understood, and reverenced the more for the understanding.

If at first, therefore, the subject of Architecture appears to be involved and obscure in its apparent message to the student, the latter may rest content in the assurance that there are many things which may be learned that the bewilderment may be translated into a co-ordinate whole, well within the grasp of an interested comprehension. He may anticipate, without fear of disappointment, that as he progresses in the subject he will experience an ever-growing interest in an entrancing study, and that his pleasure therein will bear a direct relation to the depth of his understanding.

The form in which this subject is presented to the student is, therefore, of no little importance. If it is intended to portray the development of architecture in its true form, as a steady and continual process of growth from simple beginnings to the stage of maturity, it is necessary to preserve this sense of continuity throughout the pages of a work upon the subject. Though the normal structure of a book, divided, as it must be, into distinct and separate chapters, renders it difficult to avoid dividing the historical record into equally distinct and separate periods of style, the divisions must be handled tenderly, and the links between given their full value and importance. Architectural History is no drama before which the curtain may be lowered between the acts, for the action is continuous, and the stage is never empty. Rather may it be likened to the rainbow, in which the distinct primary colours may be detected, though with no sudden change one from the other.

To regard the subject in any other way is to have a radically wrong conception of the whole phenomenon of architectural development. No doubt, if one were to make a comparison between two typical buildings belonging to times and countries far apart—say between the Parthenon and Amiens Cathedral—at first sight one might be tempted to conclude that buildings, differing so remarkably in plan, detail, and structure, could have no relation one to the other, and that they represent different types of human production.

Yet in such an extreme case as this the details of the later building may be traced in direct and logical sequence from those of the earlier. To ignore such a fact is to lose touch with all the influences which have brought about the development or decay of a style. There is not a building in the world upon which the historian may point the finger and say—Here such a style of architecture began. It is for this reason that in this work more space than is usual in a short and condensed history has been devoted to those debatable periods of architectural history which present no complete and mature style—which are periods of transition in design and construction ; for it is in these phases of its history that we see architectural style, as it were, in the making. Every building that has existed of which the style is of architectural importance, owes its form and its details, more or less, to something less complete which has preceded it. All we can say when we have found the earliest record of a special architectural feature, is that this is the earliest example we know ; what has preceded it and perished, we know not. We may be certain that something has preceded it, for in architecture as in Nature, *ex nihilo nihil fit*. Until we have hunted it down to the naked stone set up as a monument or altar, or as some less worthy object perhaps, we have not really got at the history of a single detail.

As with relations in time, so with relations in space. In no country is its architecture without some connection with that of some other country, either influencing it or influenced by it. Let us, therefore, regard the subject of Architectural History as the record of a great world-wide art in which the human race has endeavoured to give beauty and expression to structures which would otherwise be of merely utilitarian interest, and thereby to realise in material form its aspirations after abstract sublimity.

That continuity is not the peculiar characteristic of architectural history alone is apparent to all students of the past. The fact is no mere interesting coincidence but a direct indication of the close association which must always maintain between architecture and all other manifestations of human development. It needs little imagination to realise of what paramount importance were the earliest attempts at permanent structure in their influence upon civilisation, and in their tendency towards the material emancipation of Man. The lion clings to the forest and undergrowth, the cattle to the pasture and watercourse, the ape to the tree-top, and the crocodile to the river ; but Man became ubiquitous, free to dwell in districts and climes from which Nature would exclude him.

Small wonder that this product of human ingenuity should develop into the greatest of the Fine Arts, a fact of which it is easy to lose sight in these days of building contracts, rights of light, and party wall awards. Nevertheless, the great fact is there, and the more apparent as we are able to anchor down our ideas into the bedrock of historical continuity. To give patience in our regard of everyday considerations, let us be mindful of the dire necessity that hurried the laying of the first building stone, for of such are the influences which at once bind and release the designer of structure in this very matter of fact age. Nay, more—these are the common factors of architecture in all

ages and in all countries. In simple terms they may be called Purpose, Means, and Method. Initiate them with a sublime inspiration and they may be traced in all the styles of architecture which have been preserved to history.

To ignore the need of inspiration as the mainspring of architectural endeavour is to deny its very existence. Surely the man who went forth from his cave on the hillside and built a home upon the plain, was impelled by something higher than animal instinct—something pointing definitely away from the primitive towards the wonders of civilisation. We may go even further and say that the man who, driven by force from a natural shelter, defied extermination by the exercise of his ingenuity, was stepping higher than his conqueror. Faint as may be the evidence of inspiration at such stages as these, its image becomes more defined and focused as the pages of history unfold.

With all abstract things it is necessary to find their points of contact with the material, and it is perhaps more easy to trace them in architecture than in any other of the Arts. Music may speak in definite sound vibrations ; Painting may be closely allied to the spectrum of light and the forms of Nature ; Drama may have much in common with Realism ; and Dancing with equilibrium and gravity. But after all, in each case the contact is slight and does not reveal the inner meaning of the Art concerned. Architecture, on the other hand, is nothing more or less than structure, and as such it is essentially material and essentially permanent. Whether or not we profess interest, we cannot get away from it, for it involves our very existence as civilised beings. From such a firm standing we may surely learn to trace, through the material factors of Purpose, Means, and Method, that divine spark of inspiration that at once explains and reveals the Art of Fine Building.

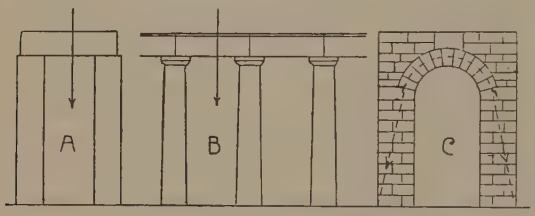
In following these stages in terms of the primitive we are merely tracing a crude alphabet from which may be built up whole words, phrases, chapters, and books of architectural thought. We have pictured the first impulse towards freedom which inspired the earliest building, and therein we can trace a definite purpose. To build a shelter against wind, rain, and cold, wild beast and human foe, was the first thought of the early builder. The means of carrying out this purpose were limited by natural resources and human perception. Rough stones, clay, trunks of trees, and the like were to hand. As the choice was made so, to a large extent, was the form of the structure determined. The method adopted in making use of the available means is another important factor in determining the form of structure. The stones chosen might be large and stable, or small, and to be knit together. The clay might be used to daub up the cracks, or it might be dried in cakes in the sun, and so on. Material alone does not impose the same rigid limitation.

All this may seem elementary and self-evident, but it is a fact that until the student has learned to seek and find these common factors within the developed styles of history, the true significance of architecture can never be comprehended.

It would seem appropriate at this stage to introduce in outline an explanation of two important systems of construction, each of which, or both of which,

will be found to be the basis of all known forms of the Science and Art of Building. They are known as the Trabeated and the Arcuated systems of construction, and they form the governing factors in all types of architectural expression. Both systems are concerned with perhaps the first and last serious problem of building—the bridging over of openings and spaces in permanent fashion. Plain walling is elementary, and human ingenuity is not heavily taxed in the making of an enclosure except where openings have to be left in the containing wall, and spanned over, or when the enclosed space has to be covered with a roof. Both provisions are obviously necessary in the construction of a shelter, since an entrance must be arranged, and openings for light and ventilation are desirable, while a space open to the sky can hardly serve at all as a shelter against the elements.

Of the two systems of construction previously referred to, the simplest in idea, and the most direct, is the " Trabeated," or Post and Lintel system ; a post being a vertical member of support, and a lintel a horizontal member spanning between points of support. By this system a door or window opening would be bridged over with a single member of sufficient strength as not to break under its own, or under the superimposed, weight to be placed thereon. The roof might then consist of a series of lintels placed from wall to wall and arranged side by side so as to form a continuous roof surface. The forces brought into play are simply dead weight resisted by adequate vertical support, and the conditions to be observed are simply the selection of members of suitable size and strength (2). The simplicity of the idea must not, however, be taken to indicate an easily attained limit of treatment, and many of the most refined and studied examples of Fine Architecture depend entirely upon this simple theme.



2. A and B = Lintel ; vertical pressure only.
C = Arch ; outward thrust.

The second system is more advanced in ingenuity, and is known as the Arcuated system. The Arch is an arrangement of wedge-shaped blocks fitted in a curve over an opening, and by the nature of its form resisting a superimposed load under which the blocks tend to wedge themselves together into equilibrium. In this case, the forces brought into play are more complex than in the Trabeated system. They consist of an outward thrust caused by the natural tendency of the arch to spread at the feet under the load, and the resistance to this tendency as provided by the material arranged to receive the outward thrust (2). The conditions to be fulfilled are mainly concerned with the provision of adequate abutment without which the arch cannot remain stable. The covering of door and window openings under this system is obvious, while it can be readily perceived that it is only necessary to extend the depth of the arch to form a continuous roof form. The system lends

itself to a greater fluency in achievement, and a wider scope in conception, so that we find this system in use among peoples of exuberant temperament and strong ambitions, while the simplest system remains for the primitive as well as for the highly cultured, which latter can perceive the wide limits within which refinement can be developed. Fig. 69 illustrates one of the most famous examples of the Trabeated system, while Fig. 184 shows another famous building depending entirely upon arched construction in its treatment. The extent by which the adoption of a particular system of construction can influence a design is made very evident in these two cases.

So far we have done little more than hint at the origin of architecture, dwelling on those aspects of utility and structure from which the Art has undoubtedly sprung. The reason for erecting a building in modern times, whether it be legislative palace, town hall, mansion, or villa, is that some corporation or some individual requires a shelter, convenient for carrying on business or for the comfort and amenity of daily life ; and such buildings are treated in a more or less decorative manner to give them what we may agree to call architectural effect. Churches and triumphal arches are instances where the purely utilitarian consideration is little in evidence, though even the church is a necessary shelter for the worshippers.

It must, however, be recognised that neither utility nor construction alone can cover or account for the origin of architecture, or of some of the features which, with modification, in detail have stamped themselves upon it, as far as one can see, for all time. Men undoubtedly, at a very early period of incipient civilisation, dug out caves for shelter, or contrived cunningly woven huts of boughs and other available materials ; but in such crude efforts it is difficult to detect the birth of a great Art, and one has to wait for a more insistent hint of its presence in work more advanced if still primitive. In later days, Egyptians, Greeks, and Romans built houses for everyday occupation ; but of those of the Egyptian there remain but a few brick foundations, some conventional pictorial representations, difficult to decipher, and a curious series of clay models of houses of the Fourth to Sixth Dynasties, of which there are still preserved examples. Of the Greek palaces of the early period we have two or three unearthed plans, and some hints in Homeric descriptions ; of the ordinary dwelling-house of the great Greek period we have little more than conjecture derived from references in literature ; of the Roman dwelling-house, thanks to Pliny and Pompeii, we know a great deal more. Of the latter, there is sufficient evidence to show that architectural treatment was not by any means confined to public and religious buildings, and it can hardly be credited that a cultured people such as the Greeks would have been content with indifferent taste or grudging display in their homes. For all that, we have undoubtedly derived the characteristic forms of column and capital, buttress and pinnacle, dome and spire, which crowd into our mental vision as signs of architecture, from those buildings which have been erected as the symbol of an intellectual or religious ideal. In such buildings the æsthetic predominated in inception as well as in resulting effect, and the severely practical element was confined mainly to those problems of stability

which are the natural postulates of architectural achievement. It is, perhaps, a little dangerous to generalise upon any important subject, but it does seem evident that since some period between mediæval and modern times there has been a growing tendency for purely practical considerations to predominate in the source of an architectural scheme. No doubt this is the direct outcome of the increasing complexities of our civilisation, and as such it is both wrong and useless to deplore its expression in a live Art. That there is room in plenty for the highest architectural qualities to find expression within the meeting of purely utilitarian needs, there is abundant historical proof. What could be finer than the great Roman aqueducts, designed simply to carry water from one height to another across the intervening valley? What could be more lovely than a group of mediæval farm buildings built for an everyday purpose? What could be more impressive as a structure than the Forth Bridge?

Where men have striven deliberately towards sublime expression we shall expect achievement as perfect as their capabilities, but it is a mistake to limit one's conception of fine architecture to such cases as these, for any great building effort, undertaken with honest purpose and ability, will assume a sublimity of its own as it materialises, and a quality which must call for admiration. It is not, indeed, too much to say that such quality in effect is a valuable guide as to the practical virtue of the building, for an ugly structure more often than not points to indirect planning and complicated construction. The broad principles of architectural design are, in fact, inseparable from practical considerations, whatever the source of inspiration.

But besides the building considered as a whole there is in all good architecture a secondary or attendant essential, that of the detail and its expressiveness in regard to its situation in the building and to the nature of the material employed. Such detail must have an æsthetic significance, a special suitability to its purpose and position, an evidence of design which leads the spectator to accept it as the best thing for its position, and as something done with a purpose and which could not well be replaced by something else. Coleridge defined poetry as " the best words in their best order." If we cannot take up an exact parallel, we can say with great truth that Architecture calls for the best details in their best positions. This is a form of æsthetic which belongs particularly to the art of Architecture, though detail and technique must find place in all the Arts. The perfection of architectural detail must depend upon very delicate nuances of design, and cannot be appreciated merely through the eye, but must be a matter of intellectual satisfaction also. In detail, however, as in the broader considerations, utility finds its natural place, for it is only after complete satisfaction of practical needs that man is allowed to indulge his fancy for ornament or elaboration which finds inspiration from natural laws.

For detail approaching most nearly to the perfect, we shall look to Greek work of the fifth century B.C., followed closely by the achievements of the Gothic period. Prior to the great Greek era, architectural history may be said to consist of a series of more or less imperfect efforts after architectural style, converging on and supplying material for its perfect evolution towards the Greek ideal.

Architecture may be said to have gathered its first strength when man set up some erection which, in however vague a manner, had for him a sublime significance ; as when Jacob, a dweller in tents, set up the stone where he had the dream of angels descending, and called it " Bethel " ; as when the builders of Stonehenge, whoever they were, set up that mysterious circle of stones, meaning something to their minds, though probably little connected with angelic visitations.

These were the simple beginnings from which sprang the wondrous achievements of the architects of history. For the student, the following chapters are intended to inform in detail of this progression of building effort down the ages, leading up by easy stages to the conditions ruling at the present day. It is hoped that the form in which these facts of history are to be presented, will assist him to cultivate an outlook which will define more clearly his attitude towards modern problems. If it merely encourages him, in his admiration of historical masterpieces, to repeat unintelligently forms and manners of a past age, then the lesson of history has been lost. If it instils into him a grasp of those great principles which govern structural design for all time, and a desire to exercise them afresh to-day, then it will have done its work well.

The student who is content to stop short at a consuming interest in archæological facts and data, is not by way of developing into an architect ; for, as the historian is only a servant to the great politician who makes modern history, so is the archæologist to the architect. To sort out old stones is an important and necessary preliminary towards a right handling of the new, but it is, after all, no more than a means to the latter end.

There is little doubt that historical knowledge, unintelligently applied, can be a distinct drag upon progress in architectural thought. Within the memory of man there have been many " battles of the styles," and yet, so far as can be seen, the style that has been almost entirely neglected has been the most important of all—that of our own age. If such a state of affairs were allowed to become perpetuated, it would result in a most grevious loss, not only to architectural development, but to the whole well-being of the community. It is a tragic paradox that we should have become so self-conscious that we should have lost all real understanding of ourselves ; that we should be so informed as to historical achievement that we should become almost incapable of achieving history. What does this state of affairs really mean ?

Without ceasing to deplore this unfortunate interlude, we may perhaps comfort ourselves with this assurance ; that a future age, looking back upon contemporary history, and viewing it from without the blurred focus of to-day, will place this period of confusion in its true relative unimportance to the inevitable stream of architectural development. It may thus appear and function as a brief and unimportant period of transition from one live coherent style to another, very different to the " close-up " impression which we receive of it to-day.

What, then, are the broad principles which must govern the outlook of the present day architect ?

First, with the genuine desire to achieve something fine and beautiful, he must learn to grasp with understanding the practical conditions which rule the particular problem upon which he is to work. If he is to design a dwelling-house, he must understand not a little as to the habits and needs of the family to be housed. The design of a church will demand a knowledge of the ritual of the worshippers and their numbers. Banks and hospitals and shops will all demand certain definite lines of demarcation with which the designer must be fully conversant if he is to meet his problem. It is exactly such considerations as these which do much to define the purpose of the designer, and they must be well in the mind almost before pencil touches paper.

The next considerations are also of a practical nature, though no one can be severed from the whole. Choice of material and of type of construction must be made as essentials of design. The disposition of structural members will inevitably limit and determine the massing of the design, while choice of material will as surely govern the disposition of members. Steel framework and reinforced concrete impose themselves upon the modern designer as essential factors in governing the character of the design. If History fails to produce exact prototypes to guide by precedent, the architect of to-day may boast of means of construction of which the past had not the freedom.

Finally, there remains the fashion in which the visible parts of the structure are to be expressed and emphasised as to reveal its nature. In this he need not fear to use the language of tradition, for so has historical continuity always been preserved. The architect is no inventor, and his ability will not be measured by his ingenuity in unearthing the New Thing, except where new conditions demand it without choice. His aim must be rather to design into contemporary thought than to stand out apart from it. History may make outcast many a building regarded to-day as "clever," on account of its unusual treatment and disregard of precedent; and will doubtless place many among the classics which unperceptive taste dubs as commonplace at the present time.

The student of to-day therefore has an even greater responsibility than had the architect of yesterday. To the experience of the latter he has his own free thought and study to add, and it is sincerely believed that the atmosphere in which he may now work is healthier, better informed, and more emancipated in ideas than has been the case for several generations. In the schools he has the opportunity of developing a corporate spirit which was difficult to attain under the old system of articled training. In Literature he has all the books to which his fathers had access and many more besides, and probably easier access to the former than was then the case. Of contemporary examples of executed work, a period of great building activity presents an unusual number of designs of quality from which to seek information. Modern facilities in travel lend him wings to visit places, to which in former times only the greatly privileged could reach.

Surely we may expect very great things from all these innovations? Perhaps of the greatest importance of all, we can trace a distinct increase in interest on the part of the general public in things architectural, Notice of contemporary work of importance finds a more frequent place in the best

journals of the day ; architectural literature is ever more widely read by the layman ; and intelligent criticism of the design of modern buildings becomes less the monopoly of the practitioner. In fact, it would seem not foolishly optimistic to hope that we are actually approaching an immediate objective, which is a future in which the community will call for, and the architect will respond in, the meeting of all structural problems with taste and reverence naturally applied, and comparable with the best that history can show. We are certainly not there yet, but we may press on as the goal comes into sight.

So much then for the end in view. The beginnings, vague though they may be in their way, may present, after all, the simpler quest.

CHAPTER I

ARCHITECTURE BEFORE THE GREAT GREEK PERIOD

It is assumed that previous to the dynasties of kings in Egypt, there were many centuries of priestly rule, and it is probable that during that period there were erections in honour of the god or gods, carried out under the order of the priests, which would have been prior to any now existing architectural remains. Herbert Spencer, indeed, laid it down that the first architects were priests, they alone understanding what kind of erection was required by the god. But if there were such erections, they have disappeared. A line of powerful and despotic kings was established, after we know not what internal national struggles. The principle embodied in the celebrated phrase "L'État, c'est moi," was carried further than even Louis XIV. ever dreamed of; the king was not only absolute, as monarch, but he was a kind of deity, or under the special protection of the gods. The Egyptian faith attached importance to the preservation of the body after death; the king had the absolute control of any amount of forced labour; hence he could command the execution of a tomb on the greatest scale, and built in the most enduring manner, to form at once the protection of his embalmed body and a memorial of his name to all time.

Thus we find the earliest important erections in the shape of symbolic architecture coming on us suddenly, as it were, in the history of the early Egyptian monarchy, with no smaller or less important predecessors to lead up to them; and not as structures for use in this life, but as tomb monuments on a vast scale, concerned with death rather than with life. Of the two pyramids which are undoubtedly older than the more familiar "Great Pyramid" at Gizeh, the oldest is that at Sakkâra, if the attribution of it to Tcheser of the Third Dynasty is correct; it dates in that case from near 4000 B.C., and that at Medûm, by Seneferu of the Fourth Dynasty, from about 3750. They are mentioned together because both differ from the Great Pyramid in being built in steps instead of with a continuous slope; that of Sakkâra (9), from the great size of the steps (only five in a height of 200 feet), there is little doubt was intended to be left in that form. That of Medûm presents a rather different problem, for the remains show that it was built in the first instance as a smaller pyramid of much steeper slope than is usually found, and added by successive outside layers, each ending in a level top lower than that of the previous layer, so as to leave the whole in a step form; but as the steps are both more numerous and narrower than at Sakkâra, it was probably intended ultimately to finish it with a continuous slope. The method of construction shown in this pyramid has led to a theory that all the pyramid tombs were built thus, and that the principle was to finish a complete pyramid on a small scale as

soon as possible, so that it might be complete in case of the king's early death, and to add to it year by year as the reign progressed. This may have been the case at Medûm, but in spite of the high authority of Lepsius, it is difficult to believe it of the Great Pyramid, in consequence of the arrangement of the internal passages, which seem obviously planned for the full size of the pyramid from the first.

The Sakkâra pyramid, which is oblong, is 396 feet on its longer sides; but the Great Pyramid, built by Khufu (Cheops) about 3700 B.C., is 755 feet on its base line, and 451 feet in vertical height. Of the two others near it, that of Kah-f-rā (*c.* 3660) has a base line of 700 feet, and that of Men-kau-rā (Mycerinus—*c.* 3630) a base of 350 feet. There are many smaller pyramids of lesser fame, which in a general history of architecture need hardly be considered; those mentioned here are the most important and typical examples. Near the Gizeh Pyramids (which are too familiar to need special illustration here) is the Sphinx, as to the precise age of which nothing is certainly known. Whether considered as Architecture or Sculpture the Sphinx makes a direct appeal to the architect by the vast effort of achievement, just as the pyramids make a somewhat similar appeal, whether considered as an engineering feat or an architectural. The line of demarcation between the Allied Arts is often slight, as also between Art and Science. The seated statues of their three founders, in the museum at Cairo, are very fine and dignified examples of portrait sculpture; and the Sphinx, which may be much older, is even more remarkable from its immense scale. Probably only a sculptor can fully realise the great difficulty of carrying out on such a scale, and with true proportion of details, a figure which, in spite of the ravages of time, still remains so grand and human in the pose and expression of the head.

The manner in which the pyramids were built has been the subject of much discussion and theorising. Had the sloping surface of the masonry been finished from the first, as it went up, it might be supposed that fresh material could have been hauled up the surface on rollers by means of a windlass; but it is obvious that they were built first in a step section, and the slope finished off afterwards. To have lifted all the stones vertically, as dead weight, up step after step, would have been a tremendous business. One suggestion is that a temporary sloping embankment of earth was constructed at one point, periodically raised by adding fresh material as the main structure rose higher, and removed when the whole was completed. To our modern engineering ideas this seems so crude an expedient, and so wasteful of labour, that it is difficult to accept it; but it is not an impossible solution. Time, in the ancient empire of Egypt, was of little consequence, and the supply of labour unlimited and to order. The Great Pyramid is said to have employed 360,000 men for twenty years. M. Choisy, in *L'Art de Bâtir chez les Egypteins*, has essayed another theory, based on the existence of a number of ancient wooden "rockers," looking rather as if they were a series of centerings for small segmental arches. M. Choisy's theory is that these were for raising stones from one step to another, the stone being rocked till a slab could be inserted under the rocker from one side, when it was rocked back again and

a slab inserted from the other side, and the same operation repeated till the block was raised to the required level. This is ingenious, and supplies a use for these "rockers" for which no other use has been suggested; but the student should guard against accepting as ascertained facts, theories which are not reinforced in many ways by lines of circumstantial evidence converging as to a probable conclusion, and even then it is necessary to receive the suggested solution with considerable reserve.

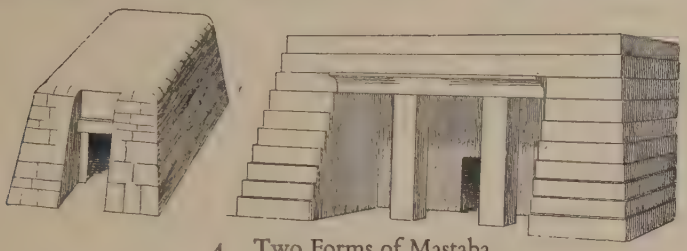
If the pyramids are not in every sense architecture, they had connected with them, in some cases at all events, small buildings which may be said to represent in embryo something of the architectural arrangement which was centuries afterwards to be developed on a vast scale in the great temples of the later dynasties. These small temples may be said to have been chapels for the worship of the king who was enshrined in the pyramid. Professor Petrie discovered the ground plan of one in connection with the Medûm pyramid, which may be taken to be the oldest known building, or relic of a

3. Plan and Restored View of the Buried Temple near the Sphinx (*c.* 3650 B.C.).

building, of temple form in existence. There is another near the Sphinx, fairly complete though nearly buried beneath the sand, which was long called "the temple of the Sphinx," but is now recognised as being connected with the pyramid of Kah-f-rā. It contains a hall or nave 55 feet long with two rows of perfectly plain square granite columns carrying granite lintels which supported the roof slabs, and a further hall at right angles to this, with one row of similar square columns along the centre. Fig. 3 shows the plan, and Fig. 3 the probable appearance of the central avenue when complete, the columns being mere squared blocks with a roof of stone lintels. There is not the slightest ornament; but in this interior we may see, perhaps, the first hint of the vast columned interiors which were to be the great glory of the later temples, though after a long interval of time.

The pyramid-building age left us another form of funereal architecture in the shape of the *mastaba*, of which there are a number of examples at Gizeh and elsewhere, and which were the sepulture shrines of lesser men, as the pyramids were those of the kings. The mastaba (4) is a rectangular erection considerably longer than its width, built with the exterior wall surface slightly sloping inwards or "battering," and with each course of masonry generally

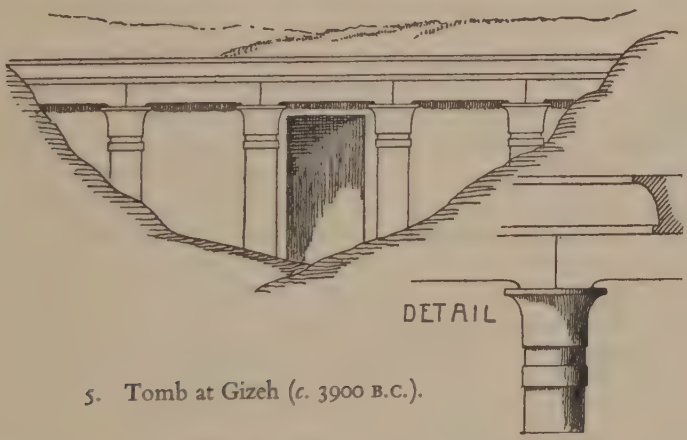
set slightly back from the one beneath it, but not so much so as to give the idea of steps. This battering of the wall surfaces is a kind of "note" of Egyptian architecture throughout its history, and seems the outcome of that



4. Two Forms of Mastaba.

desire for eternal permanence which first showed itself in the pyramids, and was perhaps partly induced by the idea of offering a better resistance to earthquake shocks. A mastaba contained several chambers opening out of one another, the disposition of these varying very much; and there was generally a deep square shaft or pit sunk at the farthest limit of the interior, at the foot of which was the recess in which the coffin was placed, secure, as was supposed, from intrusion. The top was roofed with stone slabs, which in the larger examples were supported by columns.

The architectural interest of these erections, and of the façades of rock-cut tombs of an early period, lies in the fact of this use of columns both in the interior and also very frequently in front of the porch which gave access to

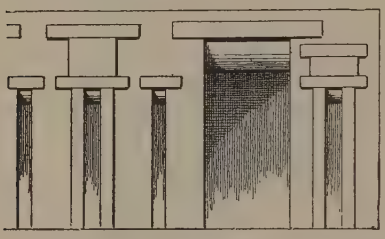


5. Tomb at Gizeh (*c.* 3900 B.C.).

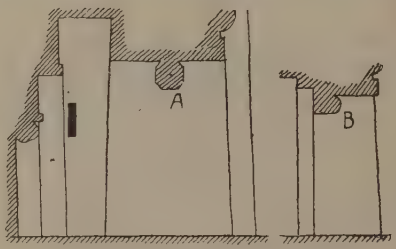
the interior; and in these columns are found occasionally the simple and unadorned forms of what were afterwards the two most important types of Egyptian capital—the bud-form capital, as one may call it, and the spreading capital. If we take the judgment of Lepsius, which places such an example as Fig. 5, from the tombs at Gizeh, in the Fifth Dynasty, it is of considerable importance in regard to the history and origin of the Egyptian capital. It

has been customary to speak of these Egyptian capitals, carved or painted with leafage, as derived from the imitation of the lotus bud and lotus flower ; but if we take the bell capital here, in its unadorned state, we see nothing to indicate such naturalistic imitation ; and the conclusion should be obvious, that the general form of the capital came first, and that the leafage which, in the examples of the later and complete Egyptian style, gives its semi-naturalistic appearance, is an ornament subsequently added to complete the decoration of the column, the whole surface of which was ornamented with figures and conventional design.

From the earliest appearance of the column in built structures in Egypt, or where it is introduced in rock-cut interiors, it is manifestly a stone form, and Egyptian architecture is essentially a stone architecture in its prevalent character, as was natural in a country where timber was scarce and granite and stone abundant. Brick was used, but only for utilitarian structures and not in the temples and tombs. Considering this, it is surprising to find, in



6. Rock-cut Imitation of Timber Work.

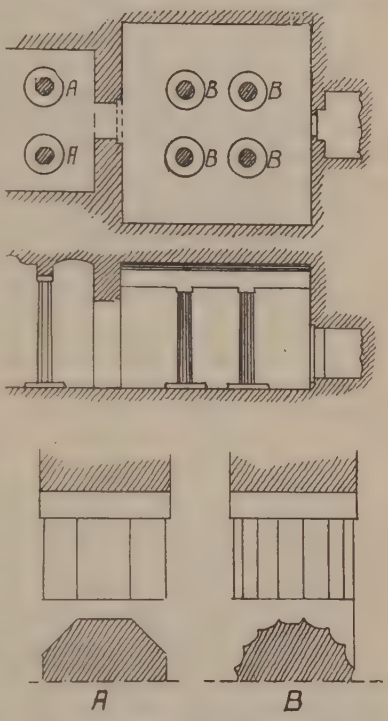


7. Section of Rock-cut Tomb.

many smaller rock-cut façades of early date, an obvious imitation of timber structure. In looking at the example here given from Lepsius (6), one immediately thinks of the rock-cut imitations of timber structure in Asia Minor (see page 43) ; the Egyptian examples do not show such realistic details of timber construction as those in Lycia, but they do manifestly represent timber ; in the section of a rock-cut tomb (7), the features A and B seem obvious reminiscences of rudely worked timber lintels ; and the question arises—how are we to account for this in a country where timber was never plentiful and could never have been a universal or usual building material ? Is it a reminiscence of construction in some other locality from which the people who became " Egyptians " had migrated ? And does it indicate any racial connection with Asia Minor ? These are questions which naturally occur, but which probably can never now be answered with any certainty.

We have dwelt at some length on these initial stages of the subject, although they do not include any of the monuments which constitute the real importance and grandeur of Egyptian architecture, because they represent the earliest developments of architecture known to us within the historic period, and therefore are the basis of the whole subject. In following the course of Egyptian architecture down the stream of time, it is hardly worth while to attempt to define a series of dated examples, seeing that dates, until a late period, are

uncertain, and are given differently by every authority on Egyptology; and the history of Egyptian architecture was not, like that of Gothic, the history of a continuous growth and development of one style from another. Of all countries with a long history (and hers is by far the longest on record) Egypt seems to have been the most conservative; and this quality is completely reflected in her architecture. After the one great change from the pyramid-building age to the temple-building age, there is hardly any further development; there are no distinct "styles" to be recognised; temples are larger or smaller, but their main features and character remain the same; the same form of column and capital meet us at intervals of a thousand years or more. There is nothing like this persistence of one ideal anywhere else in the history of architecture. Periods of time which count for much in the history of more modern nations count for little in that of Egypt. The period of rule of the barbarous Hyksos, the "Shepherd Kings," when the arts were neglected, is a barren interval in Egyptian history, but only an interval, though it lasted as long as the time from William the Conqueror to Elizabeth, which witnessed the rise, development, and decline of the English mediæval style of architecture.



8. Plan, Section, and Details of a Tomb at Beni-Hasan (2500 B.C. ?).

After the age of the pyramids and the mastabas, which in the sense may be classed together as built tombs, there is a long period before we come to anything of importance in the way of architectural monuments, and the next step, in the Eleventh Dynasty, or about 3000 B.C., is that of the excavated or rock-cut tombs, in which there is often a columned façade, as in the case of the mastabas, frequently giving admission to a columned hall on a small scale within; but in the examples at Beni-Hasan, which are the most important and significant in an architectural sense, the column is found in a different form, consisting of a stone pillar cut into sixteen sides or facets, a treatment which we may imagine to have arisen in the first instance from a desire to lighten the appearance of the square column by cutting off its angles and reducing it to an octagon; after which the further procedure of reducing it to sixteen sides was obvious and natural, as was also the hollowing of each side in order to give more emphasis to the angles; though this was not done in all cases. The example here given from Lepsius (8) shows both methods,

the two columns in the portico being octagonal and the sides flat, the four internal columns sixteen-sided, and with the sides slightly hollowed or fluted. Both forms of column diminish slightly from the base to the top ; they have no capitals except a square slab or *abacus*, against the under-side of which the column abuts, but they stand on a large flat circular base stone, which became, with some modification, the typical base of the Egyptian column throughout its whole history. It has been argued that this large flat base stone is a reason for supposing that this form of column was originally a wooden post, which would require such a base to rest on ; the argument, however, is not conclusive, as a stone column would be all the better for a wide base to distribute the pressure on the ground, and Egypt, as already observed, is a stone and not a timber country. It is to be noted that the abacus at the top of the column does not, as in Greek and all subsequent columnar architecture, project beyond the face of the beam above it, but is flush with the latter : and this characteristic obtains throughout Egyptian architecture of all dates.

It was almost a commonplace with architectural historians, on the discovery of these sixteen-sided columns, some of them fluted, at Beni-Hasan, that here was the origin of the Greek Doric column ; the rather, perhaps, as the true antiquity of the Beni-Hasan tombs was not at first realised. Since then it has been pointed out that the interval of time between the Beni-Hasan caves and the earliest remaining structures in the Doric style was at least two thousand years, and therefore that there was no necessity or reason for assuming any relation between the two. On the other hand it must be remembered that, though we have the remains of the early Doric temples of Corinth, Pæstum, and Selinus, we have no record of what kind of Greek work immediately preceded them ; the links in the chain are wanting ; and, moreover, the Egyptian sixteen-sided column (but without fluting) reappears on a larger scale in the much more important monument at Dëir-el-Bahari, forming the mausoleum of Queen Hatshepsu, dating about 1570 B.C., or 900 years subsequent to the Beni-Hasan columns ; and it appears again in a small but important portion of the great temple of Karnak. There was therefore evidently an element of persistence in this form, though we cannot follow it from century to century ; and in the absence of any other known origin of the early Greek Doric style, it seems reasonable to conclude that the form of the Greek Doric column is traceable to Egypt, although the intermediate stages are wanting.

The history of Egypt is divided into three great periods—the Ancient Empire, from the First to the Tenth Dynasty (5004 to 3064 B.C.)[1] ; the Middle Empire, from the Eleventh to the Seventeenth Dynasty (3064 to 1703 B.C.) ; and the New Empire, from the Eighteenth to the Thirtieth Dynasty (1703 to 340 B.C.), after which follow four more Dynasties, successively under Persian, Macedonian, Greek, and Roman domination, bringing us down to about A.D. 380. The foreign rule in the last four Dynasties made, however (as we shall have occasion to see later), very little difference in the general characteristics of Egyptian architecture. Roughly speaking, the Ancient

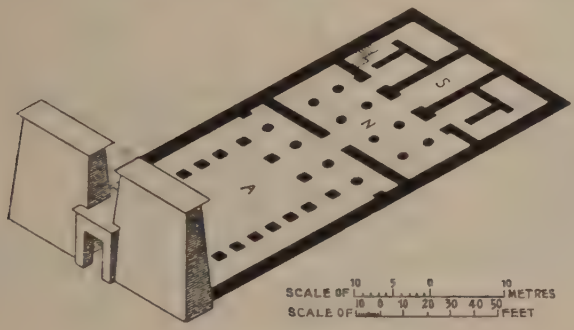
[1] The dates given are Mariette's ; they are probably likely to be nearest the truth.

9 The Sakkâra Pyramid (4000 B.C.)

10 The Ziggurat at Ur (*c.* 2350 B.C.). After Sir Leonard Woolley's reconstruction

11, 12 The Great Columns in the Hypostyle Hall, Karnak
(1350 B.C.)

Empire may be considered to be the age of pyramids and mastabas, the Middle Empire that of rock-cut tombs, the New Empire that of the vast temples which constitute the real contribution of Egypt to the art of architecture, and which are associated in the minds of most persons with the idea of Egyptian architecture, though the known history of Egypt commences more than three thousand years before the date of these monuments. And the centres of building have shifted southwards up the course of the Nile. The great pyramids and the tombs of Gizeh centred round Memphis, the city of the Ancient Empire, about 100 miles from the mouth of the Nile. The Beni-Hasan caves are 250 miles from the Mediterranean, and the great Eighteenth Dynasty temples of Karnak and Luxor centre round Thebes, more than 400 miles up the course of the Nile. There had been minor Theban kingdoms before this date, but the great Theban kingdom arose in its glory about seventeen centuries before Christ. The Thebans had then finally expelled the Shepherd Kings after



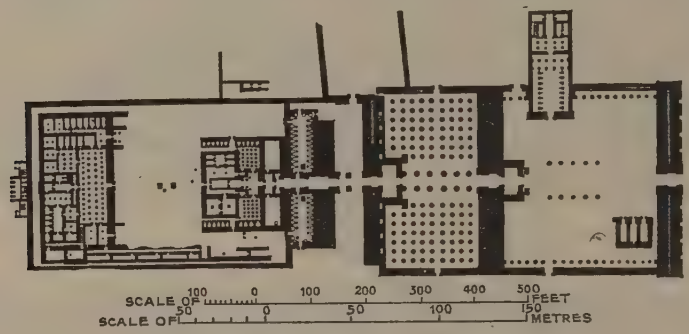
13. Type of Egyptian Plan.

their five hundred years' usurpation, and, as in some other periods of history, a great conquest was followed by an era of activity in architectural magnificence.

The vast buildings which took their rise at this period, though we are in the habit of speaking of them as temples, were not so much religious as royal shrines. As the small temples near the pyramids in the Ancient Empire were for the worship of the memory of the king sepulchred under the pyramid, the buildings of the New Empire may be said to be really the development of the ancient small columned shrine into a vast structure in which the original columned interior is not only enlarged in scale but multiplied in its complication of apartments.

The plan of the Egyptian temples (for so we may for convenience call them) is both much more complicated and much more varied than that of Greek and Roman temples, but it keeps always one characteristic—that it is a diminishing plan, grandest and most impressive at the entrance, and dividing up into smaller, more numerous, and darker apartments as we penetrate farther into its recesses. The whole theory of the plan is an anticlimax, a progression from display to mystery. M. Choisy, in his *Histoire de l'Architecture*, gives the accompanying plan (13) as an explanatory and typical

one, useful for impressing on the memory the general characteristics of Egyptian plan. The plan of the greatest of the Theban temples, Karnak, which we give here (14) is, however, far more extensive and complicated than this ; but it was not all set out or built at one time. In fact, the sanctuary, which is the only portion built in granite, was erected in the earlier Theban period of the Middle Empire, before the coming of the Shepherd Kings. According to Mariette, Amenophis I., the first king of the Eighteenth Dynasty, surrounded this with a temple court, and Thothmes I. built in front of it a frontispiece in what became the usual Egyptian manner, consisting of masses of masonry of partly pyramidal shape—truncated cones on the plan of a long parallelogram, with an entrance door between them having its head at a lower level ; both pylons and gateway crowned with that form of curved cornice, which is peculiar to Egypt, and is the universal finish or crowning member of every structure. He is credited with the erection of two more pylon gateways

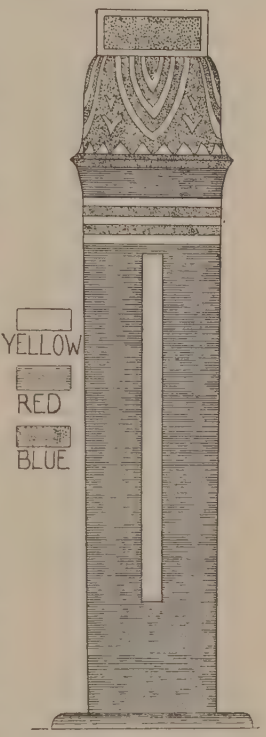


14. Plan of Karnak (1700 to 980 B.C.).

each larger than the last, one in front of the other. Later, Thothmes III. built the hall between them with a roof supported by columns of a design different from anything else in Egyptian architecture (15), and to him is credited also the doubling of the *enceinte* wall to adjust the exterior line to the increased width of the pylon façade. Two other pylons were successively added, and between them Seto I. and Rameses II. divide the honour of having built the great hall of columns. The square forecourt in front of this, and the last pylon, were added in the Twenty-second Dynasty, somewhere about 980 B.C. ; and we have the complete building, measuring about 1200 feet long and 350 feet in greatest width ; the largest building the world has ever seen.

The architecture of this, as of the Egyptian temple in general, is almost entirely for interior effect. Externally, the Egyptian temple is a box ; except the pyloned entrance, there is nothing externally but a blind wall, of great thickness, surrounding the whole. The pylons and the blind exterior wall are seen in the photograph, Fig. 23, of a part of Karnak. There might be obelisks set up in front of it, and an avenue of sphinxes giving dignity to the approach ; there was one two miles long connecting the temples of Luxor and Karnak ; but these are outlying sentinels. The building itself is a vast windowless mass

externally ; all the architectural grandeur is in the interior. As a deliberate design of structure, this is in keeping with the whole character of the Egyptian religion, a religion of mystery. But perhaps one of the most extraordinary things in relation to Karnak, when we come to think of it, is the slowness and persistency of its growth. People speak of Karnak as they do of other architectural monuments, of the Colosseum or St Peter's, as concrete objects ; but it is perhaps seldom realised that, even leaving out of consideration the original foundation of the shrine, this vast congeries of courts and columned halls and pylons was slowly developing, in accordance with one central plan and with the same style of architectural detail, during *more than seven centuries*. It is difficult for the mind accustomed to contemplate the comparatively rapid changes of the modern period of history, fully to grasp such a fact, and its significance as to the character and condition of the people who produced these solemn and stupendous structures, erected by means which we can only conjecture, and intended only for the use and entrance of the king-god and the priests ; so Egyptologists affirm, though we may doubt whether the Hypostyle Hall did not witness at times solemn functions, in which the upper classes of the people at least were allowed to take part, of a magnificence worthy of the gloomy and awful grandeur of the interior.

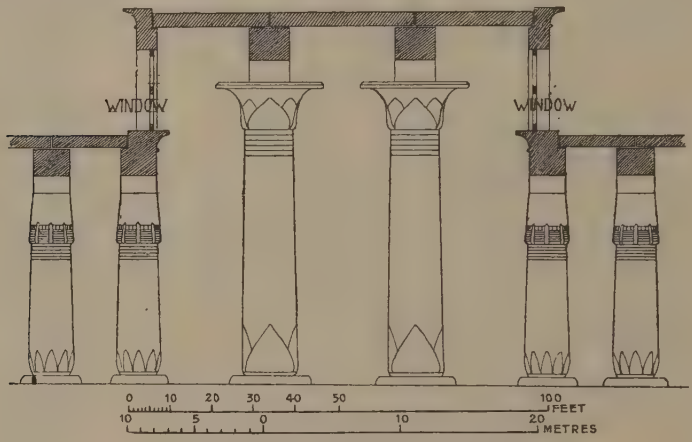


15. Pillar in Hall of Thothmes III., Karnak (*c.* 1720 B.C.).

The Hypostyle Hall (apparently so called from having a shorter order of columns below (ὑπό) the principal columns) supplies us with the largest examples of the two most important " orders," if they may be so called, of Egyptian column, that with the spreading or bell-shaped capital, and that with the elongated capital which has its greatest swell just above its junction with the column, and diminishes upwards, in a straight outline, to the abacus. These are the two master forms of Egyptian capital, which persist, essentially the same, down to the period of the Roman domination, only putting on, at a late period, some greater elaboration of decorative detail, as we shall see hereafter. There is only one other important type of Egyptian capital, that with a human head beneath each face of the abacus ; that is also only found in what may be called, relatively, the modern Egyptian period, and may be neglected for the present. In the Hypostyle Hall (11, 12, 16) the two centre rows of columns, which rise much higher than the others, have the spreading capital, the forest of secondary columns on either hand have the elongated form of capital. Above the two innermost rows of the lower columns the wall rises to the higher level of the ceiling carried by the loftier

central columns, and is pierced with windows formed of great slabs of stone with two series of vertical slits cut in them, one above the other, leaving a central horizontal bar between them. These would have sent down cross-lights from each side through the forest of columns on the opposite side of the hall, producing what must have been one of the finest and most impressive interior effects ever realised in architecture. The vast roofing-slabs, with a few exceptions, having now fallen, the effect has to be left to the imagination. Mr Spiers' fine drawing (12) shows the effect of the range of the larger columns.

It has already been shown that the form of the spreading capital is found at a quite early date in the tombs at Gizeh ; and the form of the narrow capital is found at Beni-Hasan and in many other rock-cut tombs, along with the



16. Section of Hypostyle Hall, Karnak.

primitive fluted form of column before mentioned ; a more naturalistic type of it is found at a much earlier period. The characteristic crown moulding which caps all Egyptian work, at Karnak as elsewhere, has also been imagined to have originated in the curving ends of the reeds used in early mud and reed-built huts. Of this theory it can only be said that the proof is entirely wanting, and that the Egyptian cornice moulding, with its finely designed curve (the only detail in Egyptian architecture which approaches to the refinement of Greek work) is a feature of purely architectural and masonic character, and has as little as possible the appearance of having been derived from any imitation of work in an inferior material.

Mention has already been made of the form of the columns in the hall of Thothmes III. at Karnak (15), which has no counterpart, as far as is known, anywhere else in Egyptian architecture, and must have been the result of some special influence. It has a historic interest in the fact that the form of the capital greatly resembles Persian detail, and that the fact of the column diminishing downwards instead of upwards, unlike any other Egyptian column has

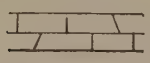
its counterpart at Knossos and at Mycenæ. That the recurrence of so peculiar a feature, in three places not directly connected geographically, can have been due to mere chance, is hardly to be supposed.

Unlike Greek architecture, in which the sculpture is concentrated so as to emphasise certain portions of the building and contrast effectively with the surfaces of plain masonry, Egyptian architecture recognises no law of reticence in surface decoration. With the exception of the outer wall of the enceinte, every portion of the structure, even the whole of the cylindrical surfaces of the columns, must be covered either with painted decoration or with the peculiar low relief sculpture in intaglio which the Egyptians employed ; these decorations generally embodying history or symbolic significations. In spite of their undoubted civilisation, the Egyptians of the periods under discussion were a semi-barbaric people, and in its architecture we naturally find a less developed feeling of refinement in detail to that which we shall discover in the architecture of the best Greek period, and a less inspiring sense of planning on a sumptuous scale in which the Romans in a later century excelled. Signs of a culture not to be despised are to be detected in a few delicate profiles of mouldings though generally these are of cruder form. The abundance of available labour is apparent in the lavish display of surface ornament, as also in the immense size of building members in use. So is the history of a people written upon the stones of their buildings, as we shall find again and again while making further study of this entrancing subject. Pennethorne thought that he had discovered in the square court at Medinet-Abu an artificial curving inward of the lines of the entablature in order to form an optical correction of the line. The curvatures, on his statement, appear to be different on the four sides ; and when an operation of that kind is traced in one temple only out of many, and considering also that a correction of that kind, if required on the interior lines, ought to have been applied to the exterior ones also, one becomes rather sceptical as to its reality, and inclined to think that it has only been a secular settlement of the buildings inwards, the settlement being naturally prevented near the angles by the mutual buttressing of the masses at right angles to each other. Such a subtle degree of refinement would seem to be beyond that stage of culture attained by the Egyptians, and Pennethorne's conjecture may be disposed of as being at any rate improbable. In Greek architecture, where the use of optical corrections of line is unquestionable, the refinement of profile of all the mouldings is in complete keeping with the spirit of exactitude which dictated the delicate curves for optical correction ; but this is certainly not the case with Egyptian architecture.

How were such vast structures as these erected ? The great columns of Karnak are 66 feet high and 12 feet in diameter ; the monolith slabs over the central avenue were 36 feet long and 4 feet thick. The columns were erected in separate drums, but very large ones, leaving much fewer joints than in the Greek columns. The erection of these, and still more of the immense roofing slabs, if done by hoisting, must have necessitated very large and powerful crane machinery ; but among the Egyptian paintings, which record so many operations of the life of the people, there appears to be no representation of

any such machines at work, as we might have expected had they been in use ; moreover, amid the closely crowded columns in the Karnak and other halls, there would seem to have been no room to work hoisting machinery on a large scale, or even to allow the roof blocks to pass between the columns. The theory of M. Choisy is that the interior was gradually filled up with sand or sand-bags as the columns went up, till finally there was a platform level with the tops of the capitals, on to which the roofing slabs were brought up from outside, by a slow process of wedging up, and taken by means of rollers to their proper places. After all was completed, the temporary filling was removed. He observes that the amount of filling to be done was much reduced by the great amount of area occupied by the columns themselves. The idea is in such startling contrast to all our modern notions of building engineering, that at first sight it seems preposterous ; but it is not impossible, perhaps not improbable. In Egypt time was of no consequence, and sand and labour were procurable *ad libitum*. It is at all events the only theory which explains how such structures could be carried out by a people whose mechanics seem to have been in a very crude state, so far as their voluminous painted records can be taken as testimony.

Although granite was used for the obelisks often set up in front of the temples, as the most enduring material, it was not the habitual building material, which was sandstone or limestone ; the only temple completely built in granite, so far as is known, being the small one near the Sphinx, already referred to, in which there is no decorative detail, That the principle of arch construction was known to the Egyptians from an early period there can be little doubt, though they never used it in their architecture, which is entirely that of the column and lintel. Lepsius gives a section of an actual arch construction, though with clumsily cut voussoirs, from a tomb at Gizeh, which may be of very early date, though Mariette is of opinion that there is no existing Egyptian arch earlier than the sixth century B.C. But some of the ceilings in the Beni-Hasan caves are in arch form, and as there is no constructional object in making a rock-cut ceiling in this form, it seems probable that it was an imitation of an arch. Among peculiarities of construction in Egyptian masonry may be named the frequent employment of oblique instead of vertical joints in courses of masonry (17 A), the object of which it is difficult to see ; and the occasional setting of a number of courses of masonry in the lower part of a wall in a sagging curve (17 B). This occurs too often to be attributed either to carelessness or to settlement of the ground ; some absurd theories have been advanced to explain it. The probability seems to be that it arose from a vague idea in the minds of the builders that a wall so constructed would oppose a better resistance to earthquake shocks.



A. Oblique Joints.

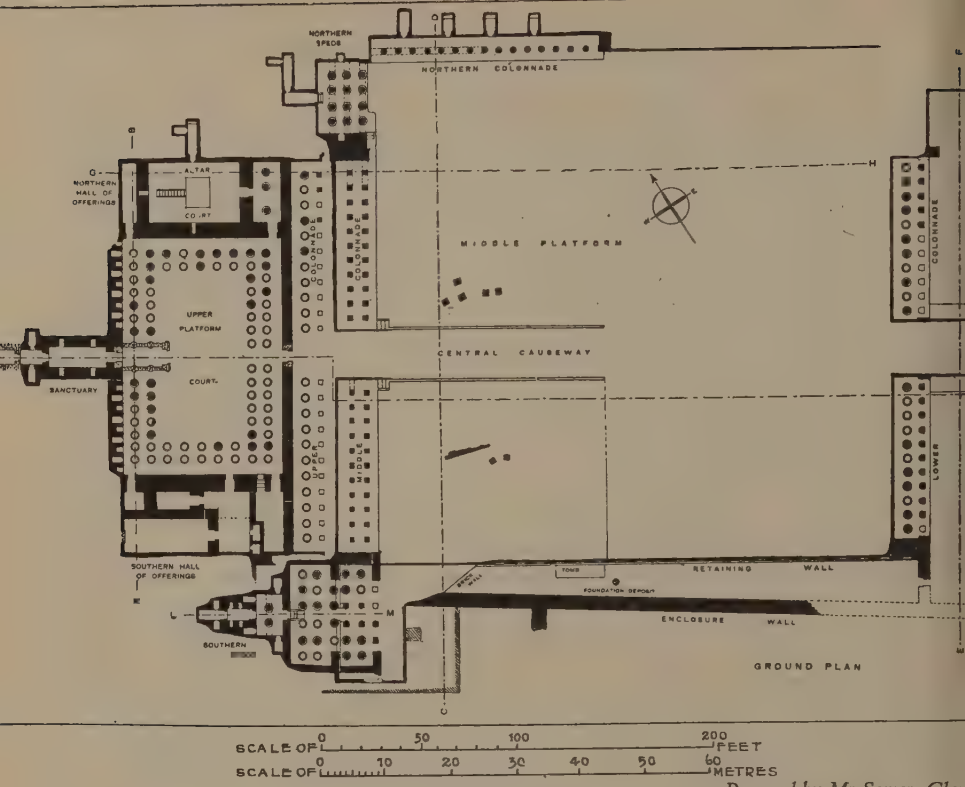
B. Curved Base-courses.

17.

On the character and aspect of the commoner forms of Egyptian dwelling-house an unexpected light was thrown by the discovery by Professor Petrie of a number of small clay models of houses, found in graves of the Tenth to

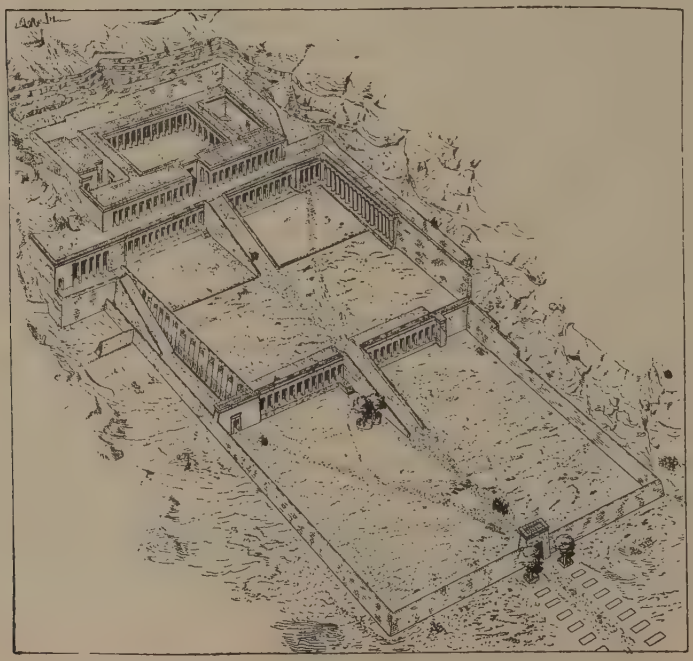
Twelfth Dynasty at Rifeh, and supposed to be intended as residences for the souls of the deceased persons. These showed a progressive elaboration, the later ones having a columned portico in front, with the house behind with a flat roof and an outside stair for access to it. Of the larger residences we can only judge by the picture plans in some of the paintings, in which the attempt is made to represent horizontal plan by a vertical picture ; from these one can gather that the house of the best class would have a central space like what in the Roman house was called the atrium, with apartments opening out of it in cross form, and perhaps adorned with columns and with symmetrically planted trees or shrubs ; smaller utilitarian apartments opening again out of these. But these imperfect representations have little significance in their obvious bearing on architectural development, of which the temples are the real and important landmarks.

We have taken Karnak as the type of Egyptian architecture, which is there represented at its highest, and the character of which differs little in other monuments of the New Empire. Plans differ considerably in extent and elaboration, but the leading forms of architectural design recur with remarkable persistence through century after century. Luxor, of which little remains, was apparently the nearest to being a rival to Karnak, with which it was architecturally connected by an avenue of sphinxes. These were on the right bank of the Nile ; on the left bank was the great mausoleum of Dëir-el-Bahari, on rising ground on the side of the hills ; below it on the plain was the Ramesseum, the temple of Ramses I., and somewhat later the temple of Medinet-Abu, by Rameses III., who also built the smaller temple of Khons, near Karnak. Dëir-el-Bahari (18, 19), the temple or mausoleum of Queen Hatshepsu, needs special mention as an architectural monument with a plan and character peculiar to itself, and different from that of the normal Egyptian temple. This erection, built in or partly against a recess in the hills on the left bank of the Nile, opposite to Karnak and Luxor, takes a form suggested by and utilising the nature of the ground. Closely bounded on three sides by cliffs, and only entirely open towards the east, towards which the ground slopes, it is formed in three courts rising one above the other, the different levels being reached by inclined causeways built up on the centre line of the lowest and second court, the inner facing wall of each court being decorated with a double colonnade on each side of the causeway leading to the level above. The plan and view are reproduced from Somers Clarke's drawings in the twenty-ninth memoir of the Egypt Exploration Fund, in which a full description of the building is given. Some of the columns are square on plan, but the sixteen-sided form of column, similar to that at Beni-Hasan, is very largely used. These sixteen-sided columns are not in the least fluted or hollowed between the angles, but are perfectly flat, though Clarke states that in some instances there is a very slight raising or projection at the angle, as if to emphasise it, and create something of the defined edge which would in a Greek column be given by the fluting. It may be suggested that if this raising of the edge is found in some of the columns it probably existed originally in all, and has been weathered away. A point to be noted is that all these walls and columns



Prepared by Mr Somers Clar

18. Plan of Deir-el-Bahari.



19. Bird's-Eye View of Dëir-el-Bahari (16th century B.C.).

were originally coated with a fine white plaster or gesso ; to quote Clarke's words, " the building appeared as if it were made of one vast dazzling stone, blinding in the glare of the intense sunlight." This is an interesting point to notice, because in recent times, in England especially, the coating of a building with a cement face, in which the minor decorative features and mouldings are modelled, has been considered to be a kind of degradation of architecture, hiding the monumental constructional material beneath a coat of more perishable material. That this is a degradation of monumental architecture is a sound view ; but it is obvious that, so far from being a modern vulgarity of procedure, it is in fact one of the oldest practices in architecture, and was here applied to a building which was intended as a monument or mausoleum in honour of one of the greatest of Egyptian sovereigns. In addition to the peculiarity of the arrangement on successive levels, evidently suggested by the nature of the ground, it should be observed how different this plan is from the normal Egyptian temple plan, in the wide lateral extension of the principal stage of the architecture ; though it still ends, as in other cases, in a small and darkened chamber, to which all the magnificence of the colonnaded architecture is but an approach. Another point of historic interest in Dëir-el-Bahari is that as an example of the arrangement of a building in elevated platforms reached by an inclined plane, it has some affinity with the forms of Babylonian architecture (as far as these can be conjectured) and with the later forms of Persian architecture, of which there are sufficiently intelligible remains ; in both of which we meet with the practice of erecting buildings on lofty platforms reached, not indeed by inclined planes, but by flights of steps, with the difference that in the Babylonian and Persian buildings the ascent was made at right angles to the main axes of the building, instead of on the axial line, as in the Egyptian example.

The other temples named in the preceding paragraph, besides other examples that might be mentioned, present much the same architectural characteristics as Karnak and Luxor, on a smaller scale and with differences in plan, and need not be mentioned in detail here, as our special object, within the limits of this book, is not to give a history of individual buildings, but a history of the development of architectural style as illustrated in typical structures.

We give, in Figs. 24–26, three examples of Egyptian painted ornament, all of which have a certain historic significance. A represents a form of square pattern which afterwards came so extensively into use in Greek work, as to be commonly regarded as an essentially Greek characteristic ; it is, however, in fact, found in a more or less crude form all over the world, B represents the spiral element in ornament, which, as we shall see, is also found in archaic Greek and in Mycenæan work. C represents, in a rather stiff and crude form, the principle of alternating features which is an important element in ornament, and which, with the Greek artists, developed into some of the most beautiful and refined architectural ornament that has ever been produced.

And here we may quit Egypt for the present. The general style of its buildings continued unaltered for centuries, and such new characteristics as

it developed under Greek and Roman rule belong rather to the next than to the present chapter.

We have traced, up to the limit set in this chapter, the slow process of architectural development in the valley or plain of the Nile, which left behind it monuments of colossal grandeur, destined indirectly to affect the whole subsequent course of the world's architecture. We now turn north-eastward to see what can be learned of the other earliest known architectural development, that of Chaldæa and Assyria, which, though no certain traces of it go back as far as the pyramids and Sphinx, yet for a considerable part of its course was chronologically running parallel with that of Egypt. There is a parallel, too, in the nature of the site ; we again find architectural monuments erected on a great and somewhat arid plain traversed, not by one but by two great rivers, which, however, unite before reaching the sea, and for a great part of their course water the same tract of country enclosed between them, and hence known to the Greeks as Mesopotamia—the land between the rivers. Here also, as on the Nile, we find that as we ascend the rivers we descend the stream of time ; the geographical progress is inverted, for while the Nile flows north, the Euphrates and Tigris flow south ; but the Chaldæan or Babylonian kingdom, through which flow the lower reaches of the Euphrates, is older than the Assyrian kingdom which borders the left bank of the upper reaches of the Tigris, though their architecture, as far as we can realise, belongs to one chapter in architectural history. The Ziggurat at Ur (*c.* 2350 B.C.) (10), which was among the buildings excavated by Sir Leonard Woolley in 1922–29, is the largest and least fragmentary example of architecture remaining from this early period.

But here the parallel ends. It is a common observation with writers on architecture that in Egypt and Chaldæa we find the cradles of the art. Chronologically this is correct ; but in architectural importance the two countries cannot be compared for a moment. The Egyptian is the architecture of Temples and of mystery and symbolism ; the Assyrian (for the Babylonian remains are so shadowy that we need not consider them) is the architecture of palaces and fortifications and fighting ; the Egyptian built with monumental materials which have left remains imposing to this day ; the Assyrian used perishable clay brick, merely veneered with stone or cement, and his buildings have gone into heaps, from which only painful investigation, coupled with a reference to rude and conventional sculptured representations, can extract any definite facts. Nor, when we have got at these, do we find anything to compare with the grandeur, barbaric though it be, of the Egyptian monuments. And as a natural result of these conditions, the architecture of Chaldæa and Assyria, except in regard to some minor details to be noticed in their place, has had less after-effect on the styles of the civilised world. It seems to have been an architecture of rude strength in the fortress, and rich but somewhat highly coloured decoration in the palace. In sculpture, indeed, as the walls of the British Museum testify, the Assyrians were real artists, and went far beyond the Egyptians ; and the Babylonians, with their free use of coloured enamels and tiles, must have produced fine polychromatic effects in

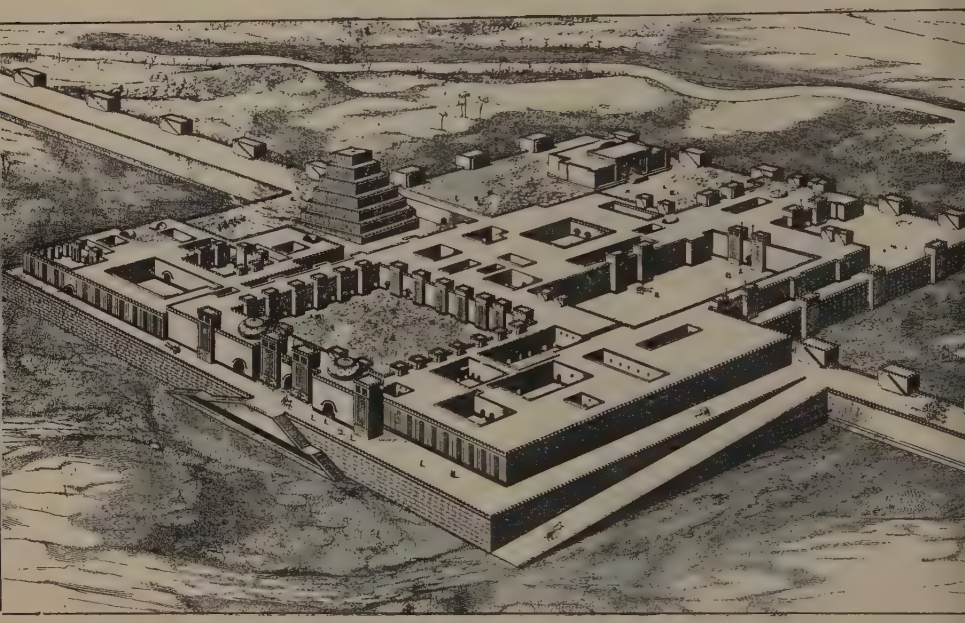
their interiors and courtyards ; but their architectural treatment of buildings *en masse* only rose to the employment of vertical reeding and trenching, with a square finish crowned by that form of battlemented cresting which, from the evidence of the sculptured representations, we can hardly doubt was the universal way of finishing off a wall at the top. A mere comparison of the plan of the palace of Khorsabad (20), the most important and complete Assyrian plan discovered, with the plan of an Egyptian temple, is enough to emphasise the difference between the aims of the two peoples. In place of

20. Plan of the Palace at Khorsabad (720 B.C.).

the axial treatment and concentrated mystery of the Egyptian plan, we have only an irregular group of courtyards, surrounded by apartments, developed naturally, though from no apparent preconceived plan or scheme.

However magnificent in its extent and decorative treatment ancient Babylon may have been—must have been, indeed, to explain in any degree the rhapsodies of historians—it was but a temporary grandeur, doomed to swift decay on account of the perishable nature of its material. As Choisy bluntly sums it up, in Chaldæa the materials were crude clay and brick ; in Assyria, crude clay and stone. The lower plain of the Euphrates seems to have furnished neither stone nor timber, and the sites of its greatest architectural monuments are now only marked by shapeless heaps. Nor did Layard's excavations at

the site of Nineveh throw much light on its architecture ; his great finds were in sculpture, in the shape of those magnificent colossal figures of winged bulls and winged lions which once flanked the portals of a king's palace, and now, in the British Museum, excite the wonder of the populace and the imagination of the historian. But these seem, so far, to have been the only substantial remnants of the palace. It was not till the investigations of the site of Sargon's palace at Khorsabad, some twelve miles north of Nineveh, first tentatively by Botta and afterwards more thoroughly by Victor Place in 1864, that we arrived at some definite information in regard to Assyrian architecture.



21. Restored View of the Palace at Khorsabad (720 B.C.).

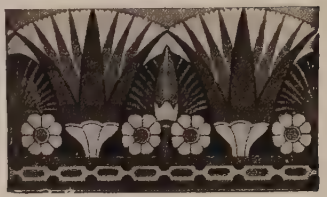
Khorsabad, as far as investigated by Place, shows the plan of the palace *à cheval* across one wall of what seems to have been a fortified town some 1500 metres square inside the walls. The first point which strikes one is that the palace (21) is built on a huge platform the same height as the top of the immensely thick walls of the enceinte, and Choisy accepts the probability that this was the recognised system in both Assyrian and Chaldæan buildings. This reminds one of the terraced platforms (before referred to) of Dëir-el-Bahari, which was indeed some seven or eight centuries earlier than the foundation of Khorsabad in the eighth century B.C. ; and the motive at Bahari was architectural. The motive for the raised platform in Assyrian palaces, for which various causes have been imagined, was probably the simple one of protection against attack. The mediæval marauding baron built his castle or château on a hill ; the Assyrian king or nobleman, living in a flat plain, made an artificial

22 The Ruins of a Great Past at Karnak

23 Pylons and Enceinte Wall, Karnak

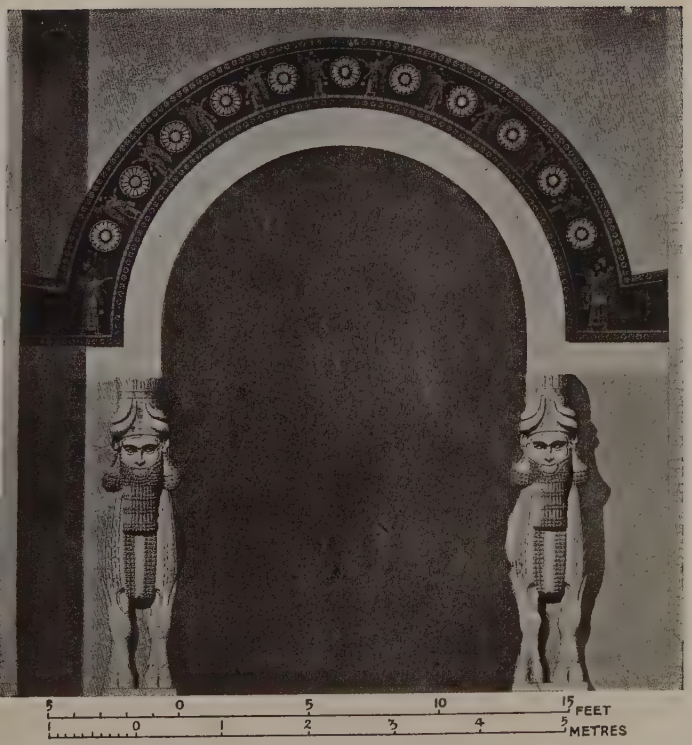
A

B

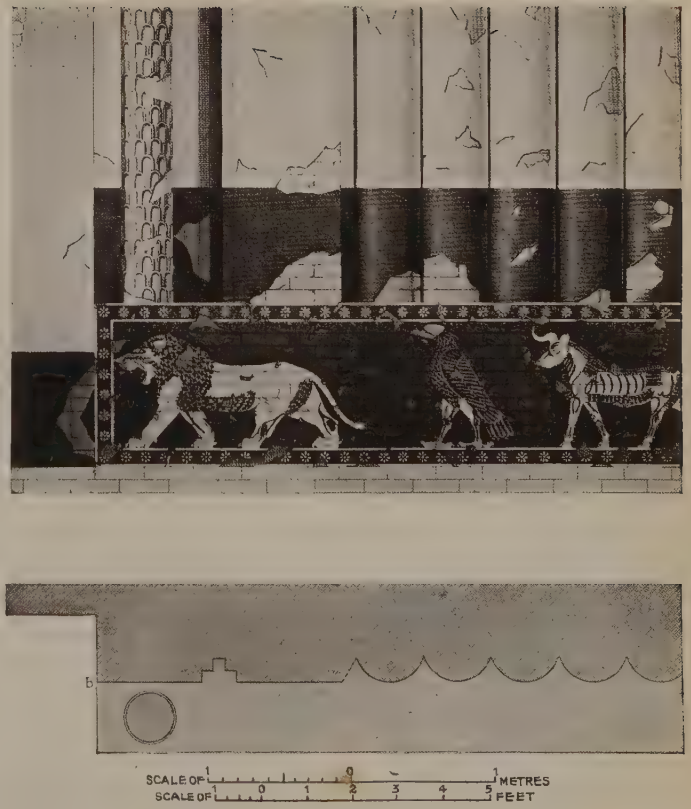


C

24, 25, 26 Examples of Egyptian Ornament

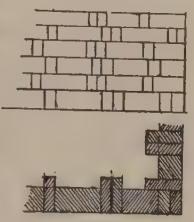


27 Arched Gateway, Khorsabad



28 Remains of Interior Wall Decoration, Khorsabad

hill for the basis of his palace, and fenced it with a brick revêtement. The manner of laying and bonding the brickwork into the clay mass in the rear is shown in the accompanying elevation and plan from Place (21). The jointing is always vertical; there is nothing resembling the Egyptian practice of oblique jointing, nor that of curved courses in building.

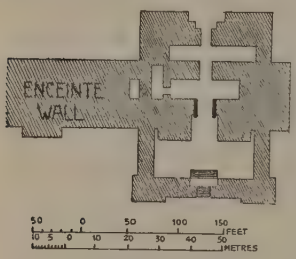


29. Revêtement Wall of Assyrian Palace.

What appears to be the most characteristic type of Assyrian architecture is found in the remains of the square tower near one angle of the palace at Khorsabad (29), built in receding stages, and with a ramped roadway round it for access to the top; four of these stages were found in sufficient preservation to afford pretty good data for its restoration. Place assumes the complete structure to have had seven, which not only falls in well with the proportions of the existing portion, but recalls Herodotus' description of the ramparts of Ecbatana, in seven receding stages, each differently coloured. Place actually recognised a difference of colour in two of the stages of the Khorsabad tower, one red and the other blue; he does not suggest in what manner the difference of colour was produced, whether by surface colouring or coloured material. The treatment of the walls was the very simple and naïve one of a series of projecting pilasters, each with a double sinking or recess up the centre of its face, and two similar sinkings on the face between the pilasters, producing a series of vertical lines repeated over the whole surface; Fig. 30 gives the plan of these. It has been argued that this is a reminiscence of timber treatment, but there is no special reason for thinking so; on the contrary, the shape of the recesses on plan, in two receding faces, is just that which would be suggested as a natural effect in brickwork, by setting it back in two thicknesses, just as the form of cresting to the walls is formed by one large brick placed centrally over two others; and, in fact, the plan of the recesses in the Assyrian walls is exactly the outline of the cresting, placed horizontally. The only other important form of wall decoration, besides the sculpture, was the employment, both on the exterior of the enceinte walls of Khorsabad, as well as on some of the interiors, of what may be called a reeding ornament on a very large scale (each projection some twelve or fourteen inches in width), or might be regarded as a series of contiguous half-columns, only that they do not answer to our idea of a column by showing anything in the nature of a capital. It has been argued that this feature is suggestive of a wooden origin; that it is a reminiscence of the appearance of trunks of trees placed vertically side by side; it might be so explained, no doubt, if the country had been one in which timber had ever been so plentiful as to form a building material in habitual use; but this is little likely in Assyria, and still less in the more southern plain of Babylon, on the architecture of which, no doubt, that of Assyria was mainly founded. After all, it is an exceedingly elementary form of surface decoration, and hardly needs a special archæological theory to account for it.

30. Plan of Wall Treatment.

Place found no indication of any chamber within the great tower at Khorsabad, as in the Egyptian pyramids ; it appeared, as far as he could dig into it, to be a solid mass. Though this is the only tower of this class of which we have any intelligible remains, we can hardly suppose it to have been an exceptional erection ; towers in stages, on a similar model, existed at Babylon and elsewhere in Chaldæa and Assyria ; that they were a characteristic of the architecture of the country ; and it is impossible not to connect them with the Biblical legend of the tower of Babel. This may have been evolved long before Khorsabad, no doubt ; but the great scale of the Khorsabad palace, and the still greater scale of that of Koyunjik (built in the succeeding generation), and the elaboration of ornament indicated in some of the details which have been preserved from both palaces, testify to a long antecedent period of power and prosperity, which must have had a corresponding illustration in architecture ; and the foundation of the Babylonian monarchy, with its buildings celebrated at least in story, is supposed to date back to 2000 B.C.

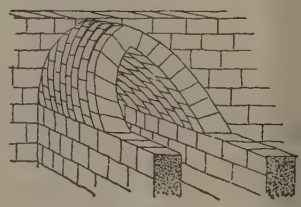


31. Plan of Gateway, Khorsabad.

(The Black portions show the position of the bull figures.)

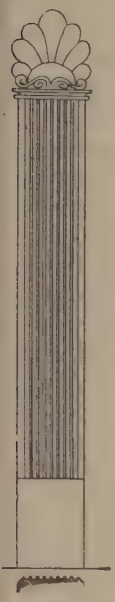
The design of the outer gateways at Khorsabad, which was found by Place nearly complete, with its arch springing from the backs of human-headed bulls (31), and its decorative archivolt in coloured enamelled bricks, is the most dignified piece of Assyrian architectural design that we have any record of.

It is possible that some of the smaller rooms of the palace of Khorsabad were vaulted with brick arches ; Place gives an illustration of the remains of a vault which he discovered, and which appears to have been built without centering by the system which seems to have been practised everywhere in the East, of setting the rings of the arch out of the perpendicular (32), at such an angle that the mortar or the adhesiveness of the sides of the voussoirs retained them in position till the ring of the arch was completed, when the next ring was built in the same manner, until the whole space to be vaulted was filled in. It is not likely that there was anything in the nature of a domical covering at Khorsabad, there is indeed no compartment of such a shape as to require or suggest it ; but Layard thought that the accompanying representation, on a slab found at Nineveh (44), was a proof of the use of the dome in Assyrian architecture. Standing by itself, however, this representation, with its two conical erections in the rear looking very like modern Portland cement kilns, is a very doubtful piece of evidence, unless we knew what its scale was intended to be ; it may only represent a little group of huts or some such erections ; it is no proof that the dome was a feature of Assyrian

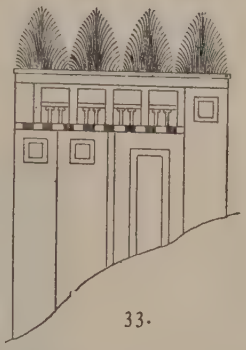


32. Assyrian Method of Vault-building.

architecture on a large scale. Other bas-reliefs found at Khorsabad and Koyunjik are very interesting and significant in an architectural sense; in one we seem to see a crude early form of the Ionic capital; in another representation (33) there is an employment of small colonettes in the upper story of a building in a manner singularly resembling a favourite feature in English designs of the "Free Classic" school; but these are only sculptured representations which may be more or less accurate; the features represented have not, so far, been discovered in the remains of actual buildings. Place, however, figures an actual stele discovered by him at Khorsabad (34) which, if accurately represented, is very remarkable as being a kind of suggestion in advance of two features in Greek architecture, the fluting of the column and the radiating plant-like ornament so common in Greek antefixæ. The crude form of this latter feature recurs constantly in Assyrian ornament, but the fluted shaft appears to be unique; there is no indication of such a feature in any of the Assyrian representations, and the production of this single example, so unlike anything else among the Assyrian remains, suggests a doubt whether it is really an object of Assyrian make and date, and not something of outside provenance.

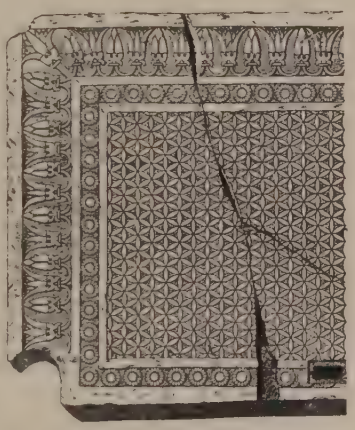


34. Stele from Khorsabad.



33.

Though there is not the slightest relation between Assyrian and Egyptian architecture in the principle of construction and the treatment of buildings *en masse*—a fact fully accounted for by the difference both in the objects of the principal buildings and in the materials available—the connection is readily traceable in some of the decorative detail. The border ornament in the large carved slab from Koyunjik (35), of which there is a cast in the British Museum, is so like a common feature in painted Egyptian ornament that it would be difficult to say, apart from the other details, to which country to credit it. It is also worth note that the one good moulding found in Assyrian architecture, that which crowned the stylobate of the building at Khorsabad called (rightly or wrongly) the "temple," bears a remarkable similarity to the one good moulding found in Egyptian architecture. The curve is less refined



35. Slab from Koyunjik (700 B.C.).

than in the Egyptian moulding, and shows the important difference of being slightly under-cut, but the resemblance, both in its outline and its use as a crowning feature to a portion of wall, is remarkable. Other decorative details there are which seem to owe nothing to Egypt; the circular *paterae*, for instance, on the glazed brick decoration over the Khorsabad gateway, a feature which occurs frequently in Assyrian ornament, and the conventional floral ornament branching on each side from a centre (36), also of frequent occurrence, and which does not seem to be suggested by anything in Egyptian detail, for in the spreading lotus ornament of Egypt the leaves or lobes all lessen towards the extremity, and end in points; the lobes in the Assyrian ornament thicken towards the extremity, and are then rounded off. And this, and not anything in Egypt, seems to be the crude original of the more highly finished and refined conventional ornament of the Greeks, in which, though the lobes are pointed and not rounded at the end, the principle of increasing their thickness from the springing to the extremity is preserved. Indeed, one cannot see such an illustration as that just mentioned, which Layard gives as a part of the Assyrian "Tree of Life," without thinking at once of the Greek antefixa ornament (104), which is here, as it were, in the rough.

36. Floral Carving from Khorsabad.

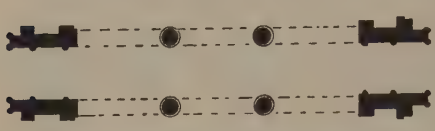
The internal architecture of the Assyrian palace, which must have been very rich in effect, was essentially an architecture of sculptured stone slabs on a brick backing, and but for the sculptured slabs we should know little about it now. Both in the execution and in the decorative disposition of sculpture the Assyrian was a far superior artist to the Egyptian. Both covered their walls with portraits of kings and representations of their achievements or of other historic events; but the Egyptian painted or carved his figures in a very naïve manner and with little attention to or knowledge of anatomy, and spread them all over the wall surface without regard to effect. The Assyrian bas-reliefs, carved in stone in low relief, are most powerful and life-like representations of men and animals, showing great observation of the facts of structure and movement, and only sufficiently conventionalised to render them, as it were, an integral part of the architecture; and (which is the important point in an architectural sense) they were grouped on the horizontal spaces of friezes or (more properly) dados, presenting a decorative stratum of sculpture contrasted with plain wall spaces—a far more artistic method of treatment than the Egyptian manner of covering a wall all over with figures, like a page of a book. Where there were not such bas-reliefs the walls of the Assyrian palaces were covered with stucco, which appears to have been usually painted white in the upper portions of the walls, and black at the foot. In one of the chambers at Khorsabad, was found an interior decoration of that kind of large-scale

reeding already noticed as a frequent method of exterior decoration. In connection with these also were portions of two columns decorated with a diaper of a scale-like character ; from this, as well as from some of the representations in bas-reliefs, it appears that when the surfaces of columns were decorated it was with a diaper ornament, a fact which further emphasises the exceptional and doubtful character of the specimen of a fluted stele given by Place.

Such was, as far as now known, the architecture of the Assyrians ; evidently extraordinarily rich and sumptuous in its decoration, much of which, the sculpture especially, is of very fine character ; but an architecture still essentially barbaric, deficient both structurally and æsthetically in the monumental element without which no architecture, however richly decorated, can have the highest and most permanent interest. Structurally, it was an architecture of decorative veneering on a *fond* of perishable material, which time has reduced for the most part to nearly unintelligible heaps, whose story is only doubtfully told by the remains of their stone veneering ; and æsthetically, as far as exploration has been able to make out the plans of its buildings, it was an architecture in which centralisation and symmetry in planning held little or no place. There may be more discoveries to be made yet of Assyrian sculpture and decoration, but there is probably nothing more to be discovered in regard to Assyrian architecture as the art of planning and building, and it has had no permanent influence on the succeeding history of the world's architecture.

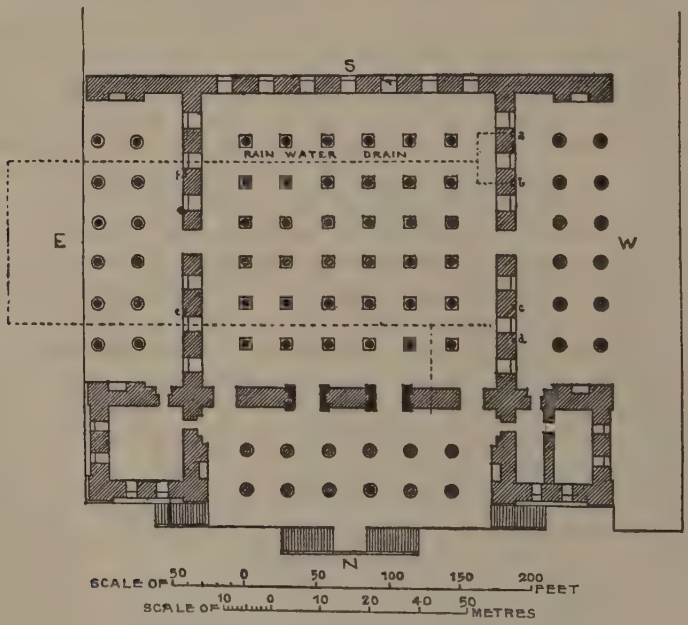
There is, however, one short chapter in the history of pre-classic architecture which may be regarded as a kind of sequel or appendix to the chapter of Assyrian architecture, viz. : the architecture of the Persians from the middle of the sixth to the latter part of the fifth century B.C. Fergusson assumed that the Persian architecture of this period is really a key to the features of Assyrian architecture which have perished. But whereas the Assyrians used brick walls and vaults with only a facing of stone slabs, the Persians built the decorative portions of their buildings in solid stone, with brick connecting walls between ; with the result that in the most important remains of their palaces, at Persepolis, we have gateways and columns standing free, the soft brick walls which once connected them having been washed away by the storms of centuries. But to conclude that, because the Persians came into possession of what had been the Assyrian Kingdom (already conquered by the Medes), their architecture represents what Assyrian architecture was before its brick walls perished, may be assuming far too much. Early Persian architecture, in the period before Alexander, is, in fact, a *mélange* of various influences, the result of conquest in Asia Minor and Egypt as well as the conquest of what was once Assyria. Two features of Assyrian architecture only are clearly and unmistakably shown in Perisan architecture. One is the elevation of buildings on a lofty built-up platform, of which the first example is that of Pasargadæ, built by Cyrus, in which, however, the masonry differs from that of Khorsabad in that it is built of stones symmetrically laid and sunk and drafted at the joints (in other words, what is now called " rusticated " masonry). Of the architecture which was erected on this platform little or nothing is left. At Persepolis we

find again the built-up platform, but in this case the stone facing is not rusticated or in symmetrical blocks. The other distinctly Assyrian feature is the existence in the state gateway at Persepolis of winged bulls flanking the portals (37). The sculptures of lion-hunts in bas-relief on the walls of the stairs leading up to the platform are also completely in the school of the Assyrian sculptures.



37. Restored Plan of Portal, Persepolis.

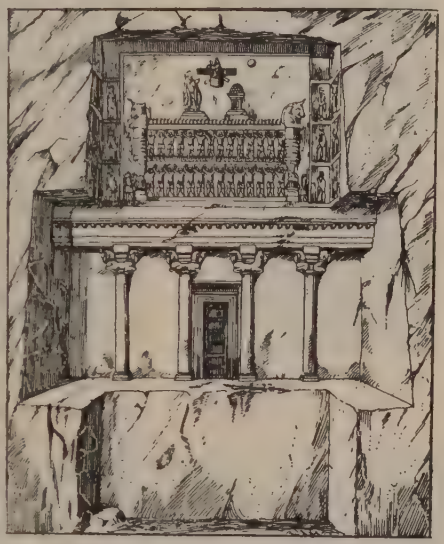
But beyond this there is nothing discernible of special Assyrian influence in the remains of Persian architecture. The Persian style of the period of the Achæmenidæ is, in fact, one of the most curious problems in architectural history. For some of its features no precedent is known, or probably will ever now be discovered. For the explanation of others it must be remembered that the period from the middle of the sixth to the middle of the fifth century B.C. was a time of Persian conquest. Of the architecture of the period of Cyrus, the first Persian conqueror, the remains left are so scanty that we cannot draw



38. Plan of Hall of Xerxes, Persepolis (485 B.C.).

much conclusion from them as to his buildings. Pasargadæ gives us one tall slender column, the capital of which has gone, and the base of which has an odd but probably only accidental resemblance to the usual base of the Egyptian column, a flat drum of shallow dimensions, and appearing as if it were a purely utilitarian expedient for distributing pressure. This column, according to the

drawings given of it, is without fluting. Its architectural significance lies in its tall and thin proportions, showing that it was a column only for carrying a comparatively light timber superstructure, if not itself of a wooden origin. But there is one structure at Pasargadæ, apparently unique of its kind in that neighbourhood, and which has been fancifully called " the Tomb of Cyrus," which is very significant in its way. Cyrus conquered the greater part of Asia Minor, and no one who compares the illustration of a tomb in Lycia (46) with this Persian erection (43) ought to have any reasonable doubt that the form of this latter is derived from Asia Minor. Were there a number of such erections in Persia, one might doubt which country influenced the other ; but when we find Lycia full of such erections and this single example (as it appears to be) on Persian soil, there can be little doubt of its derivation. But it is hardly to be called Persian architecture ; it is an exceptional thing, and might have been passed over but for the fact that it is the best preserved Persian monument of its date, and that it has been rather prominently brought forward in books in which its probable connection with Asia Minor does not seem to have been recognised.

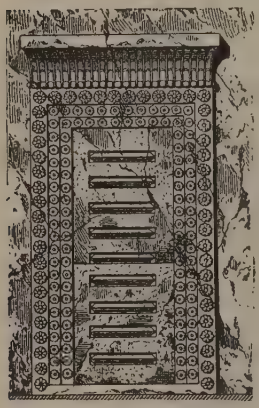


39. " Tomb of Darius," Naksh-i-Rustam.

Before the most important remains of Persian architecture, the palaces of Persepolis, had been built, Cambyses had conquered Egypt, and it is to this fact that we must look to explain some of the features of the palaces built by Darius and subsequently by Xerxes at Persepolis. The plans of these palaces, with their square columned halls (38), are so similar in general idea to the hypostyle halls of Egypt, and so unlike anything we know of previously in Assyrian and Chaldæan territory, that we may assume that they are, in plan at least, the outcome of a new acquaintance with Egyptian architecture. The great difference consists in the much smaller space occupied by the supports, and in the attenuated proportions of the columns (as shown in Spiers' restored view of the interior), which are in this respect more slender than even the latest types of Corinthian column in Greek and Roman architecture. Both these facts indicate a superstructure of timber, with its lighter weight and greater length of bearing ; and this conclusion is completely confirmed by some of the rock-cut façades of the same date at Naksh-i-Rustam, where we see the repetition of the Persepolis column with its double bull's-head capitals, with the beams and ends of the rafters cut in the stone above them. The façade of the so-called Tomb of Darius (39) shows an ornamental sculptured

erection above, with animal-headed angle features, and it is possible that this may represent an upper story of the palace above the main colonnade ; but this is by no means a necessary conclusion ; it may represent only a symbolical bier or sarcophagus carved above the strictly architectural portion of the façade ; and in any case it is a representation exceedingly difficult to work out structurally as a portion of an actual building.

At the top of the principal flights of steps leading up to the platform at Persepolis we are brought face to face with direct Assyrian influence, in the presence of the porch flanked at either end by two winged bulls in alto-relief, already referred to (42) ; while in the stone doorways which are left stranded between the spaces once occupied by the mud-brick walls, we come on almost the direct imitation of the curved and reeded cornice as it is used over the doorways of the Egyptian temples (40) : the method of reeding or fluting is slightly different, as it is often divided into two or three heights or niches by cross curves, and the profile curve of the cornice is by no means so refined in character as in the Egyptian examples ; but of its Egyptian origin there can be little doubt.



40. Door Architrave and Cornice, Persepolis.

The Persepolis capital, in its most elaborated form, is to the modern and western eye one of the strangest details in the whole history of architecture. The simplest form of the capital, consisting only of the heads and forequarters of two bulls or horses back to back, has something to recommend it as a decorative treatment of a form of bracket-capital intended to lessen the bearing of the longitudinal roof timber, and the hollow left between the heads seem as if intended (not unsuitably) to receive the end of a large transverse beam. The more elaborate form of capital, as found both at Persepolis and (a little later) at Susa is not a little startling in design, and to appreciate it fully, one would need a very much more complete heritage of sympathetic understanding than the meagre historical record at one's disposal can induce. The lower part of the capital may possibly have been suggested by Egyptian detail ; the middle portion, with its volutes placed vertically, has no known precedent, but as a possible germ of the Greek Ionic volute it has its distinct interest for the student of the classics. Whether there is indeed any relation between these forms so similar in outline though equally diverse in application is, however, a very moot point, whereas the origin of the Ionic capital can be traced with greater probability from the early rock-cut examples of Asia Minor, to be noted hereafter.

The base of the Persian column is one of its best features, and may have some relation with the form of capital in the Hall of Thothmes at Karnak (15). It may seem odd that what forms a capital in one country should be applied as a base in another, but the Persian column in other respects is so foreign to our modern

41 View of Hall of Xerxes, restored (485 B.C.)

42 Winged Bull Portal, Persepolis (520 B.C.)

43 So-called " Tomb of Cyrus "

44 Slab found at Nineveh

45 Pilasters from Treasury of Atreus

46 Built Tomb, Lycia

47 " Beehive " dwellings at Alberobello in Southern Italy

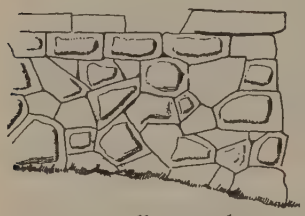
ideas of design that this transposition of a foreign feature from one use to another is by no means impossible. It should be added that the Persepolis column is fluted, but by no means in the severe and developed manner of the Doric column, hereafter described, with its twenty flutes carefully set out ; the fluting of the Persian column is rather an indiscriminate striation of many small channellings, giving a general surface effect, but not following any strict rule of setting out on plan. Thus it can hardly be an imitation of early Greek work, and may have been an indigenous detail calculated merely for decorative effect.

The researches of Dieulafoy at Susa, however interesting and valuable in themselves, have not added much to our knowledge of Persian architecture in the strict sense of the word, though they have brought to light a very rich and effective style of coloured and partially relieved mural decoration, in which the influence of Assyrian tradition is more apparent than in the purely architectural element of Persian buildings. As a minor feature, we may notice the constant recurrence of a circular patera ornament, generally of twelve lobes ; a feature which also occurs at Persepolis, as in the doorway already shown in Fig. 40, which is completely decorated with three series of such pateræ all round the architrave.

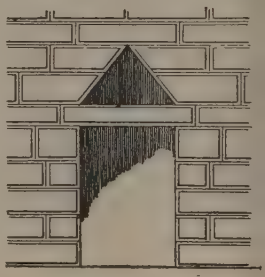
Persian architecture of the early period has left evidence of a number of conceptions which as to plan demand our unqualified admiration, but in rendering of treatment less within our comprehension. It would, however, be presumptuous were we to make little of the Art of the period, when most obviously we have not the eyes to see it as the artist of the period saw it. The later period of the Sassandæ, which is treated in another chapter, has a more obvious part in the development of fine building.

So far we have been dealing with early architecture in lands outside of Europe—in Egypt and in Western Asia, which were in some respects and at some periods very closely connected and inter-influenced, as we may say, in regard to architectural forms and details, but which stand in a very different position as regards their influence on architectural history and development. Egypt, through the medium of Greece, has had an indirect but undeniable influence on the subsequent architecture of the world, and many of her great monuments remain in a condition in which we can realise and appreciate their grandeur almost as fully, perhaps, as if they were still in their first complete state. In the case of Chaldæa and Assyria, and of the early historic period of Persia, on the other hand, we have only the *disjecta membra* of what we can dimly perceive to have been, in their day, vast and richly decorated palaces of a somewhat barbaric splendour, the " restorations " of which on paper (and many such restorations have been attempted) are for the most part matter of pure conjecture ; and which, so far as we can judge by the details which remain, have exercised little permanent influence on the architectural style of the West, though it would be absurd to assert that such an activity in architecture has had no effect upon subsequent development. The statement that little permanent influence has been felt must therefore be understood as relative to that more obvious response to, say, Greece and Rome.

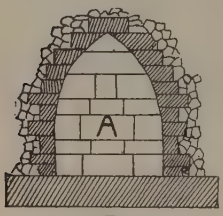
One ancient, and to a great extent prehistoric, class of buildings has to be taken account of—prehistoric in the sense that little or nothing is known as to the people who erected them or as to their precise date, which may be almost anywhere between 2000 and 1000 B.C. These are the structures which are classed under the vague term "Pelasgic," though who or what the Pelasgi were can hardly be defined; and they are connected rather by their general characteristics than by geographical position. To a certain extent it may be said, however, that Pelasgic architecture brings us somewhat nearer to Europe, and to Greece especially, than the styles we have been hitherto considering. Some of its most important monuments are found in Greece; but, in general, Pelasgic architecture may be encountered anywhere on the shores of the Eastern Mediterranean and in the Mediterranean islands. It is an architecture mainly of forts (or fortress-like dwellings) and tombs. Among it characteristics are a frequent employment of random polygonal masonry (48) in very large blocks (such as have been popularly called "Cyclopean walls"), and a treatment of doorways with sloping jambs; sometimes, in what are probably the oldest examples, the door is a triangular opening, formed by oversailing courses of masonry with their ends bevelled off so as to form a continuous slope, the two jambs meeting in a point at the top. This form was probably adopted when there was a difficulty in procuring either wood or sufficiently long stones for lintels; and the employment of a form of doorway narrower at the top than at the bottom was no doubt with the object of shortening the bearing of the lintel. In other cases we find doors with upright jambs and a lintel, but with a triangular quasi-arch above the lintel (formed as before described, by oversailing courses bevelled off), to act as a relieving arch and take the weight off the lintel (49). The Pelasgic builders also made frequent use of the form of arch or dome which is produced by oversailing courses of horizontal masonry with their ends shaped so as to give a continuous curve—the form of the arch without the proper arch construction (50); a curious phenomenon in early buildings to which we shall have to return.



48. Wall at Cnidos.



49. Doorway at Assos, Asia Minor.

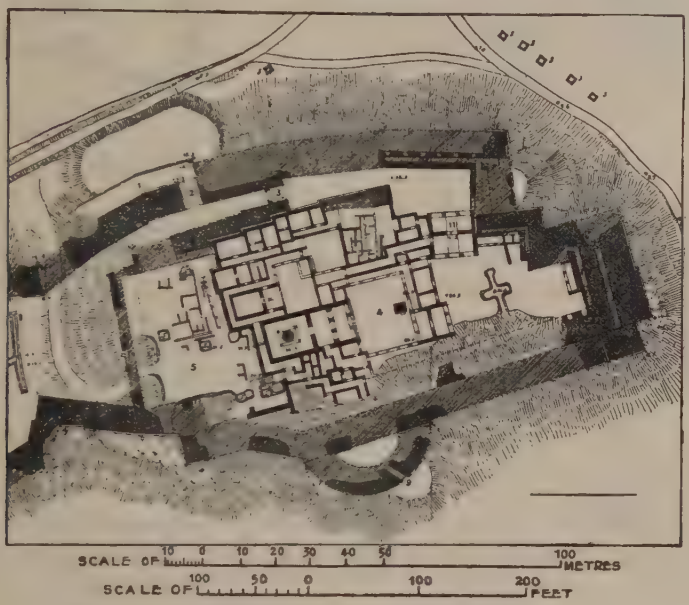


50. Necropolis of Tantalus, Sipylus.

According to their distribution, some groups of Pelasgic buildings have been styled "Ægean," and others "Mycenæan." The remains grouped under the latter title are the most important, for they include two very celebrated

structures, and they bring us a step nearer to Greece, or to sites closely connected with Greece; for Troy (Hissarlik) is so near akin to Tiryns, as far as its ruins can be made out, that the two must be grouped together. The other most important remains are those at Orchomenos and at Mycenæ, from which latter the nomenclature is, of course, derived.

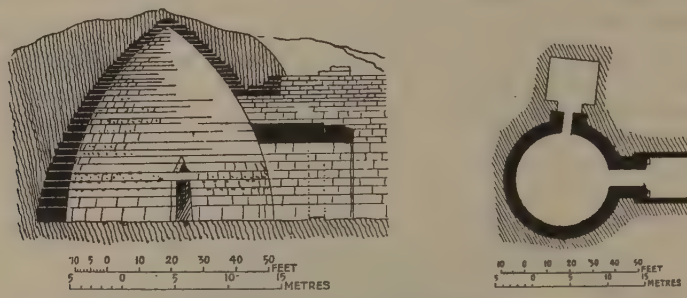
The ruins of Troy, with all the trouble that has been taken to draw out superimposed plans of different periods indicated by the excavations, have nothing for us of architecture; not a detail has been found that can be classed under that heading; it is nothing but a piling up of masses of masonry into



51. Plan of Palace at Tiryns (11th century B.C. ?).

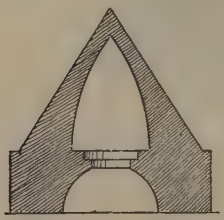
thick walls—*rudis indigestaque moles*; not even any definite plan can be made out with certainty; but it has a manifest affinity with the thick enclosure walls and rude masonry of Tiryns: the same class of people built it. Tiryns gives us a very interesting plan (51) of a king's or ruler's fortified palace some time previous to the date of Homer. Here we see a plan, of the usual rambling type of ancient plans, but with the manner of life of the occupants pretty clearly indicated in the position and relation of the larger apartments; but it again gives us little that can be called architecture; columns there evidently were in some situations, but they have disappeared, and the only bit of what might be called architectural effect left is the celebrated long gallery in the enceinte wall, very crudely vaulted with huge stones placed so as to form a pointed-arch section, but rather tumbled together than properly built as an arch.

At Mycenæ we find a much more important relic, the pointed domed chamber which has been called the Treasury of Atreus (52), nearly 50 feet high from the floor to the apex, formed in the likeness of a dome but built with over-sailing courses of stone with level beds ; and a *dromos* between retaining walls



52. Section and Plan of the Treasury of Atreus (12th century B.C. ?).

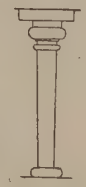
leading up to it. There was a similar domed tomb chamber at Orchomenos, of which the dome has fallen in. It may be observed that this form of pointed dome is also found in Egypt, as in the instance from Abydos here given in a sketch section (53). Both at Mycenæ and Orchomenos we find the characteristic door openings with slightly sloping sides ; at Mycenæ there is the triangular relieving arch over the lintel ; in both cases numerous and regularly spaced rivet-holes in the walls indicate where metal ornaments of some kind were fixed : at Orchomenos round the doorway ; at Mycenæ the whole interior of the domed chamber seems to have been decorated in this way. Over a doorway in the citadel of Mycenæ is the celebrated sculpture of two lions, with what used to be thought an inverted column between them, its larger end uppermost. But the pilasters which flanked the door of the Treasury have since been found, in a cellar at Westport House, Ireland, having been brought over by a former owner of the house many years ago and forgotten. By the present owner, the Marquis of Sligo, they have been presented to the British Museum and can now be seen there, restored where necessary, flanking a model of the doorway (45) ; pilasters diminishing downwards like the sculptured column between the two lions, and decorated with a kind of chevron ornament.



53. Dome Pyramid, Abydos.

That this form of column, with the larger end uppermost, was no local accident but a once generally accepted form we have had further evidence since Sir Arthur Evans's discovery of the palace of Minos at Knossos, which might also be regarded as a building of the Mycenæan group, as far as the architecture is concerned. Its ornaments and paintings have a style of their own, which has been called " Minoan," and even various successive styles of " Minoan art " have been distinguished, on what seems rather slight ground. But the Knossos

palace, though a far more civilised kind of building than Tiryns, is connected with Mycenæ and with its group by the fact that the only actual architectural members found there were precisely some small columns wider at the top than at the base, as in Fig. 54. It has been suggested that the form originated with the employment of inverted trunks of trees for supports, of which the smaller end could either be driven into the ground or supported on some wider base, while the wider upper end afforded a better rest for the ends of beams. This, though possible, is of course mere conjecture. The idea of the upward diminution of a column is so familiar to us from habit, that the reverse treatment naturally appears to our eyes ugly and unstructural. It might have appeared otherwise to those who had been used to no other form ; but at all events it was not accepted by the later civilised Greek mind, and its use died out before Greek architecture in its higher form was developed.



54. Form of Column found at Knossos.

The arch form produced by oversailing courses of masonry, of which the Treasury of Atreus is the largest and most important example but of which there are numerous instances in Pelasgic architecture, is worthy of study. The nature of true arch construction has been lightly touched upon in the Introduction and illustrated in Fig 2, where it will be seen that outward thrust is inevitable, and that the arch has no stability until the last voussoir has been put in place. The form of construction used in the Treasury of Atreus, however, would be stable during construction up to the point of equilibrium of each oversailing course. It is therefore possible that such a structure might be erected without temporary support by the slow process of laying course upon course, each to become set in position and so form a firm bed for the next. It will be realised that the true arch construction demands the use of temporary centering until the form is complete, and that for a large arch or dome, the centering itself is no mean effort of construction. A truer knowledge of the resources of the times would permit us to form a more exact judgment as to whether the above considerations were a determining factor in choice of method. As it is we are forced to leave the matter as one of those unsolved problems of history which are at once its labour and charm.

There is an old Eastern proverb which runs :—" The Arch never rests." The words are expressive, and if we were to suppose that that abhorrence of restlessness which is so apparent in the architectural treatment of the developed Greek style, was carried consistently into a choice of building method, we might be approaching a truer solution to the question. Greek mentality might well demand a minute sympathy between æsthetic taste and practical construction, so that arched construction would naturally go by the board as an element of unrest which was out of character with the refined restraint in architectural expression which their culture demanded. Out of such a selective taste spring many of the masterpieces of building throughout the pages of history, and while the modern student need find no call to eliminate the arch, he will do well to consider the fruits of consistent thought and practice. History demands a breadth of understanding if its lessons are to be reflected into action.

We said nothing of the arch in connection with Egyptian architecture, because into Egyptian architecture properly so-called the arch does not enter. But the Egyptians were perfectly acquainted with the principle of the arch. In connection with the Ramesseum are some arched vaults, considered by Egyptologists to be of the same age as the rest of the building, but which form no part of its architectural design. Obviously, the Egyptians regarded the arch as a utilitarian method of construction, to be used for a special purpose when necessary ; but for their great temples they preferred the severe and eternal structure of vast columns and flat roofing. It is worth note, too, that in the Beni-Hasan caves and in other rock-hewn Egyptian tombs the ceiling is frequently cut into the form of a segmental arch. The natural inference is that this is a reminiscence of a built arch ; there seems to be no object in it otherwise.

Though it appears that vaulting was used in parts of the Assyrian palaces, no vaults now remain in position. The discovery of the Khorsabad gateways, however, put the matter at rest ; we have there true semi-circular arches on a pretty large scale.

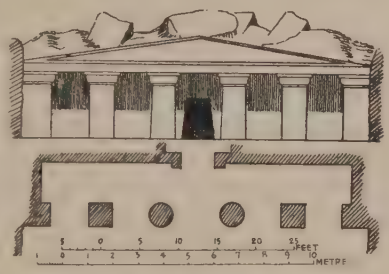
We may take it, therefore, that though both the Egyptians and (as we shall see) the Greeks refused the arch as a feature in architectural design, the invention of the arch probably dates at least as far back as the known history of architecture.

How came it, then, that the Pelasgic builders made such extensive use of the false arch form obtained by merely shaping the ends of horizontal masonry courses ? It would seem, on the face of it, to be a more troublesome mode of construction than the true arch, and without its structural advantages, though it has the one convenience of getting rid of outward thrust while retaining whatever beauty may be supposed to lie in the arch form. We find it not only in such important structures as the Treasury of Atreus, but in numbers of instances in doorways and other openings. Its use in this manner seems to imply that they saw a beauty in the form for its own sake, but disliked the true arch construction for its nature. It is difficult to suppose that the builders of so important and highly finished a structure as the Treasury of Atreus could not have built their dome in arch construction had they been so minded. On the other hand, Texier shows in his *Asia Minor* a structure of polygonal masonry, at Cnidos, with a true semicircular arch with keystone built into it : the polygonal masonry implies early work. This, however, is a very exceptional instance.

It seems, therefore, pretty certain that the knowledge of the arch is as old as anything else in architecture, but that the use of it, structurally and architecturally, was disapproved by the Egyptians, the Pelasgic builders, and the Greeks. We who have seen such a wonderful development of arched architecture in Byzantine and Gothic work, and who are ready to use the arch, both structurally and architecturally, whenever conditions of structure and design seem to suggest it, find it perhaps hard to understand this ancient aversion to its use. But the fact is one to be borne in mind, since it furnishes a key to the light in which an immense proportion of ancient builders regarded the art of architectural design.

A phase of architecture to be noted, in the period preceding the great Greek period, is represented by the numerous small rock-cut tomb façades to be found

in Asia Minor, more especially in Lycia ; of which there are probably many more in existence than those which have already been seen and sketched. The peculiarity of these is that they represent the most frank and realistic imitations in stone of wooden construction that exist anywhere. In many of these there is hardly any attempt even at conventionalising the original timber structure into masonic forms ; the beams, the half-notching of the framework, the wedges for holding it together, are all realistically present. Some of these façades have pediments ; some represent a small columnar façade with two columns with rudely carved capitals of Ionic pattern, between wide pilasters at the angles. It was formerly a favourite idea with architectural historians that these rock-cut façades of Asia Minor were the *origines* of some of the features in Greek Doric which appear to have had a wooden origin. In some cases they seem to tell the tale of this wooden origin most remarkably ; we see what, in the wooden structure would have been the ends of rafters, forming features, like the mutules of the Doric style, or suggesting features like the vertical blocks between the metopes, which by some have been supposed to represent the ends of beams. But this idea, though rather fascinating, must be regarded as doubtful. It does not seem possible to date these Lycian tombs with any accuracy ; it may be that they are hardly earlier than the fifth century B.C., in which case the older Doric temples, with the style already fully formed in all important particulars, would have been before them. And the rude Ionic column façades, in default of any certain dating, might after all have been only clumsy copies of already existing Ionic temples. So with this curious façade at Urgub shown by Texier, which has the Pelasgic form of doorway (55) ; it is an interesting incident, but one can hardly decide whether this stumpy colonnade, in relation to the early Greek columnar architecture, is in the nature of a cause or a consequence.



55. Rock-cut Façade at Urgub, Asia Minor.

With the exception of Egypt, with its long-continued succession of buildings, century after century, still showing practically the same style, the age of architecture previous to the Greek period is a kind of prodigious welter of various types of building, some of them of great elaboration and importance in their day ; of styles which flourished for a time, died out, left a few heaps of ruins to tell imperfectly the tale of their past greatness, and appear to have had no permanent effect upon architectural development. It is not till we come to the rise of Greek architecture that we enter on the great course of European architectural development, in which one style arises in historic succession from another—Roman from Greek, Romanesque from Roman, Gothic from Romanesque, in a steady stream of which the glorious and perfect Art of Greece is the fountain-head.

B.C.	EVENTS IN GENERAL HISTORY.
5000	Mena and first Egyptian dynasty (Ancient Empire).
4500	
4000	
3500	Fourth Egyptian dynasty : Khufu (Cheops) : 3733. Menkaura (Mycerinus).
3000	Middle Egyptian Empire commences (3064).
2500	
2000	Egyptian government transferred from Memphis to Thebes (2400). Hyksos kings take possession of Egypt (2233).
1500	Babylon founded (?). Hyksos driven out of Egypt (1700) : XVIII. dynasty : commences new Empire of Egypt. Queen Hatshepsu. Thothmes III., greatest dominion of Egypt in history.
1000	Assyria becomes independent of Babylon. Ramses II., King of Egypt. Exodus of Israelites from Egypt. Taking of Troy (?). Dorian invasion of Peloponnesus (1100).
900	Homer.
800	Assyria becomes leading power. Etrurian confederation of twelve cities.
700	Rome founded (750). Sargon, King of Assyria (720).
600	Destruction of Babylon (683). Destruction of Nineveh (607).
500	Pisistratids at Athens (560). Cambyses conquers Egypt (523). Cyrus founds Persian Empire (*c.* 550).

ARCHITECTURE BEFORE THE GREEK PERIOD.

ARCHITECTURAL MONUMENTS.

EGYPT.	ASSYRIA.	GREECE.	PERSIA.
Rock-cut imitations of timber structure.			
Pyramid at Sakkâra.			
Sphinx (?). Tombs at Gizeh. Pyramid at Medûm (3750). Great Pyramid, Gizeh (*c.* 3700). Temple of the Sphinx (so called) 3650. Mastabas			
belong chiefly to this period.			
Rock-cut tombs, Beni-Hasan.			
Granite sanctuary of Karnak. Obelisks become a fashion.			
		Remains of earlier palace at Knossos(?).	
Inner court and pylons, Karnak. Temple of Deir-el-Bahari. Hall of Thothmes III., Karnak. Temple of Luxor commenced.		Palace at Knossos, Crete (?).	
Hypostyle hall and its pylons, Karnak. Ramesseum. Temple of Luxor completed. Temples of Medinet-Abu and Khons.		Palace at Tiryns (?). Treasury of Atreus, Mycenæ (?).	
Forecourt and outer pylons, Karnak.			
	Khorsabad (720). Koyunjik.		
			Passargadæ. Persepolis.
			Hall of Xerxes, Persepolis.

CHAPTER II

GREEK AND ROMAN ARCHITECTURE

PAUSANIAS, some time in the second century A.D., writing down his dry annotations of facts about what he saw in buildings and fables he heard in connection with them—a kind of Murray or Baedeker of ancient days—visits the sacred places of Olympia near the western coast of the Morea, and describes, among many other things, the temple of Hera, otherwise named the Heraion. "The style of the temple," he says, "is Doric, and pillars run all round it; in the back chamber (*opisthodomos*) one of the pillars is of oak." Both facts named are significant, though in very different ways. We are once more amid an architecture whose principal monuments are temples, as was the case in Egypt—an architecture too which, like that of Egypt, depended largely for its effect on the use of columns; but while in Egypt the columns are all inside the building only, in the Greek temple they are for the most part outside the building; as he observes, "the pillars run all round it," and they and their superstructure constitute in fact the main elements of the architectural design. Pausanias notes also the odd incident that amid all these columns, presumably of stone, one only was of wood. To assume that this points to the fact that all the temple columns were originally in wood, is a supposition which may approach very nearly to the truth; but whatever the true facts, such an argument is at least slight upon which to base an assumption in favour of the origin of the stone Doric Order as arising out of the forms of wooden construction. We shall not leave the subject at such a point without maintaining a mind open to further considerations which may or may not lend colour to such a theory. It would surely be just as easy to conclude that the one wooden column was a makeshift—a cheap repair; or possibly that it had some ritual significance. The latter explanation is indeed partly suggested by his only other mention of a wooden column, on the same site :—

"What the Eleans call the pillar of Œnomaus is as you go from the great altar to the sanctuary of Zeus; on the left there are four pillars with a roof on them. The structure has been erected in order to protect a wooden pillar which is decayed by time and is kept together chiefly by bands. This pillar stood, they say, in the house of Œnomaus, and when the house was struck by lightning the fire which destroyed all the rest of the house spared this pillar alone."

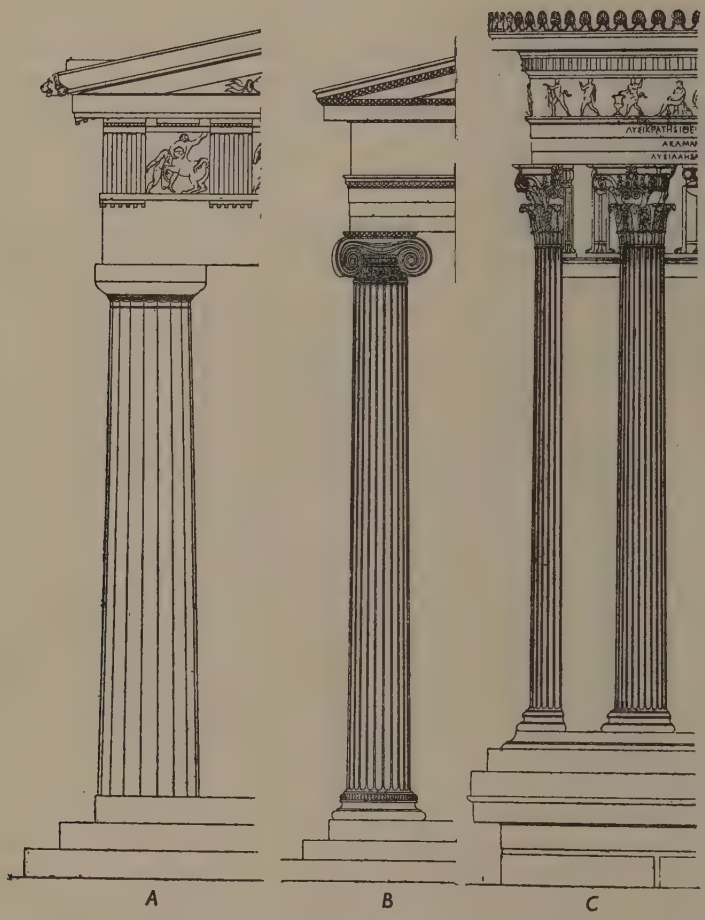
This was clearly a pillar with some sanctity attached to it. May it not have been the same with that other pillar in the temple of Hera? At all events, we cannot assume the wooden origin of the Greek Doric style on that doubtful evidence; we must interrogate the style itself, in the earliest remains of which sufficient is left to give us the features, proportions, and details of the architecture.

The Heraion is believed to be the oldest Greek temple of which any traces are left, and may date from the eleventh or twelfth century B.C. There are sufficient remains of the building to make out the plan—that of a long narrow temple surrounded by a colonnade ; six columns at each end and sixteen at each side (counting the angle column twice). The wide spacing of the columns suggests that the superstructure was of timber. What fragments there are of the capitals differ considerably in design. There appears to have been a smaller colonnade within, rather close to the walls, and every alternate column connected to the main wall by a short cross wall ; an unusual feature. But we have few details ; only the statement of Pausanias that, as he saw it, it was " in the Doric style." But at what date it assumed the form in which he saw it, there is nothing to show.

It is a matter of popular knowledge that there were three styles of Greek architecture, called respectively Doric, Ionic, and Corinthian (56) ; though the latter, in spite of its name, is really rather a Roman than a Greek style, having been only, as it were, experimented on by the Greeks, and carried to its full development by the Romans. These Greek styles are exhibited almost entirely in temple buildings ; Greek was essentially a temple architecture ; and the typical arrangement of the plan and of the main architectural ordinance was the same, whatever the style of columnar architecture employed. There was always a central building within solid walls, in general comparatively long and narrow, which was the temple proper, the *cella* (to use the Latin form of the Greek " Naòs "), and in front of or around this was a series of columns, with a space between them and the cella, which formed the exterior architectural face of the building, and over which the roof extended, covering colonnade and cella in one span. In a small temple the cella walls might be uncovered at the sides, there being only a portico of columns at one end, or at both ends ; in a larger one there would almost invariably be a colonnade round all the four sides ; sometimes a double colonnade at each end, with a single one at the sides ; or in the largest and most sumptuous buildings there might be a double colonnade at the sides also. The architectural features of the colonnade come (vertically) under four main divisions :—the Column ; the Architrave, laid horizontally from column to column and carrying the weight of the superstructure ; a section of wall above the architrave, which is usually a field for decorative treatment, and in the Ionic and Corinthian styles is called the Frieze, but in the Doric style has a different treatment (to be described) ; and the Cornice, which at the sides represents the over-hanging brow of the roof, but is also carried round the ends of the building. The whole assemblage of architrave, frieze, and cornice, is called collectively the Entablature. The roof was invariably a sloping roof of low pitch with a central ridge, the sloping lines of which show at each end of the building, with a cornice of their own rising from the horizontal cornice, and forming what is called the Pediment.

Of the three styles referred to, the most essentially Greek is the Doric. The Romans carried on and developed the Corinthian style, which had been little more than suggested by the Greeks ; they adopted the Ionic style, though treating its details with far less beauty and refinement than are to be found in

the best Greek examples ; but the Roman style which they called, or which Vitruvius calls, Doric, is a style with less monumental grandeur and freer detail than the Greek Doric. The true Doric style is found only on Greek soil or in districts conquered or colonised by Greeks ; and in its finest and culminating



56. The Three Greek Orders (no scale).

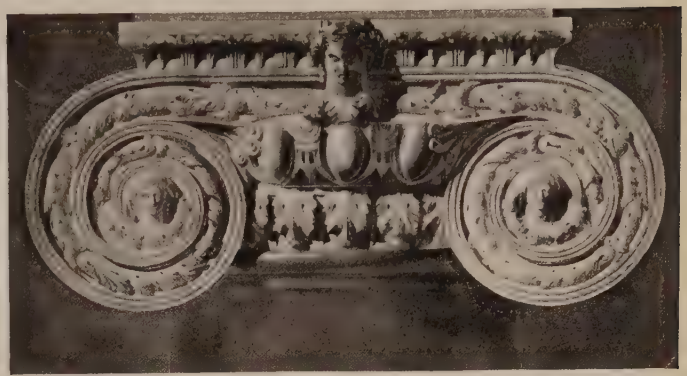
A. Doric (Parthenon). *B.* Ionic (Erechtheion). *C.* Corinthian (Monument of Lysicrates).

example, the Parthenon at Athens, it is the most abstract and intellectual example of architectural design which has ever been erected by man. Why the style should be specially called Doric there appears to be little but a legendary reason. Historic tradition has it that the Dorians, a tribe inhabiting the region of Mount Œta to the north of the Gulf of Corinth, at some period about 1000 B.C., more or less, overran great part of southern Greece, driving out or scattering the races then in possession of the soil, becoming the dominant people,

57 Greek Carved Ornament from the Erechtheion

58 Base from Temple of Apollo Didymæus at Miletus

59 Corinthian Capital from Epidaurus (400 B.C. ?)



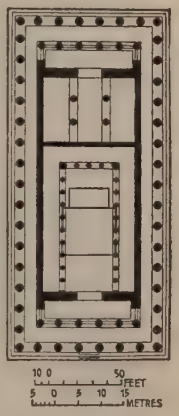
60 Late Roman Ionic Capital, now in S. Maria Maggiore

61 West Front of the later Temple of Diana, Ephesus (356 B.C.)

62 The Theseion, Athens (420 B.C. ?)

and making important settlements also in Sicily and in south-west Italy. That these raiding mountaineers had much to do with founding an architectural style can hardly be supposed ; the artistic element was probably supplied (as in other instances in history) by some of the conquered tribes ; and it is a fact that the people of Athens, which produced the most perfect of architectural monuments, were Ionian rather than Dorian in their racial connection. The Dorians, however, being the powerful race, contrived to give their name to the style of architecture especially characteristic of the country and the colonies over which they had laid their grasp.

Some questions in regard to the origin and development of the Doric style will perhaps be better understood by the reader previously unacquainted with the subject, if we reverse the chronological order of study for the moment, and consider first the most complete example of the style as it is exhibited in the Parthenon. Without understanding what Doric architecture was in its completeness, structurally and æsthetically, it is not easy to appreciate the significance of some of the characteristics of the earlier and less refined examples.



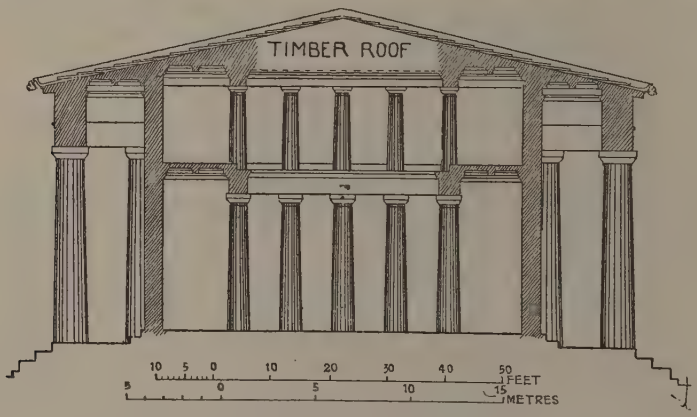
63. Plan of the Parthenon.

The Parthenon was founded about the year 440 B.C., after the final triumph of the Athenians over the Persians: to replace, on the Acropolis at Athens, the older and smaller temple which had been destroyed in the successful raid of the Persians in 480 B.C. The Parthenon stands to some extent on the basement walls of a temple projected by Cimon, but not entirely, as his intended temple was somewhat longer and narrower. As the plan shows (63), it is a temple with a cella divided by a cross wall into two chambers, large and small, the larger being the temple proper ; and surrounded by a colonnade of eight columns at the ends and seventeen at the sides, with an inner colonnade of six columns at each end, somewhat smaller and of rather closer spacing, so that they are not axial with the front columns. In the interior of the temple there was a colonnade of ten still smaller columns, parallel with the longer axis of the temple, and about one-fifth of its width from each side, and returned at the inner extremity of the temple ; these probably had an architrave and another tier of columns above them (an arrangement still to be seen in one of the temples at Pæstum), to assist in carrying the roof, while adding to the architectural effect of the interior. The smaller apartment (*opisthodomos*) had four columns arranged in a square in the centre, which are supposed, from the marks left, to have been Ionic columns with bases. The building was undoubtedly roofed with timber, covered with tiles of thin marble. Many theories have been put forward, and imaginary sections of the roof made, to show the manner in which the interior was lighted ; but there is no foundation in fact for any of them, and the probability is that it was not lighted at all, except from the door, any more than the Egyptian temples to which its ancestry is probably to be traced.

Figs 64 and 65 show the original elevation of the Parthenon and its probable section ; Figs. 66 and 67 show its present state.

64. End Elevation of the Parthenon (438 B.C.).

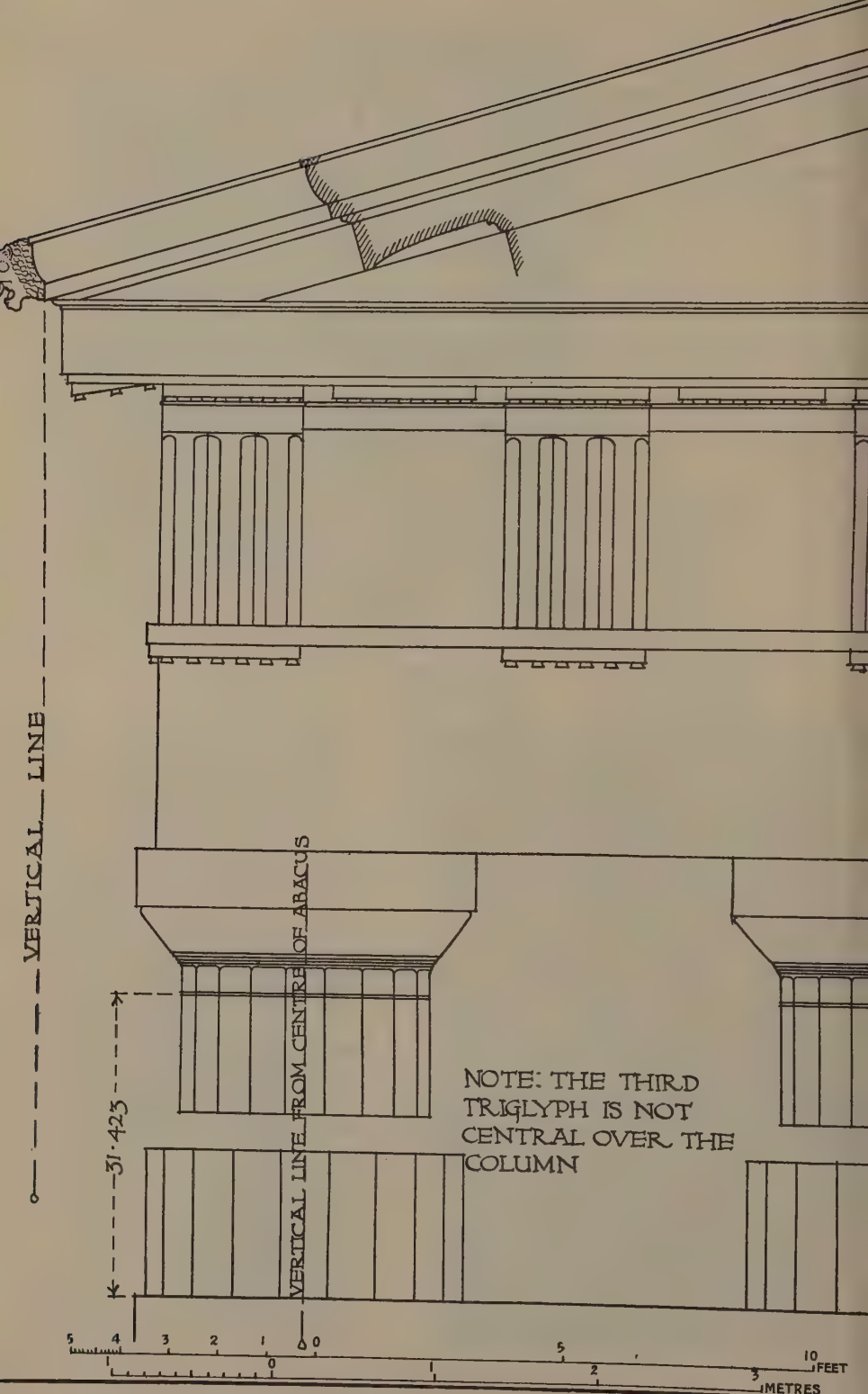
To come now to the details. That the Doric column had no base, but came straight down on the upper step of the stylobate, is probably due to the fact that, owing to the comparative massiveness of the columns and their close spacing, a projecting base would have left an inconveniently narrow space for



65. Probable Section of the Parthenon.

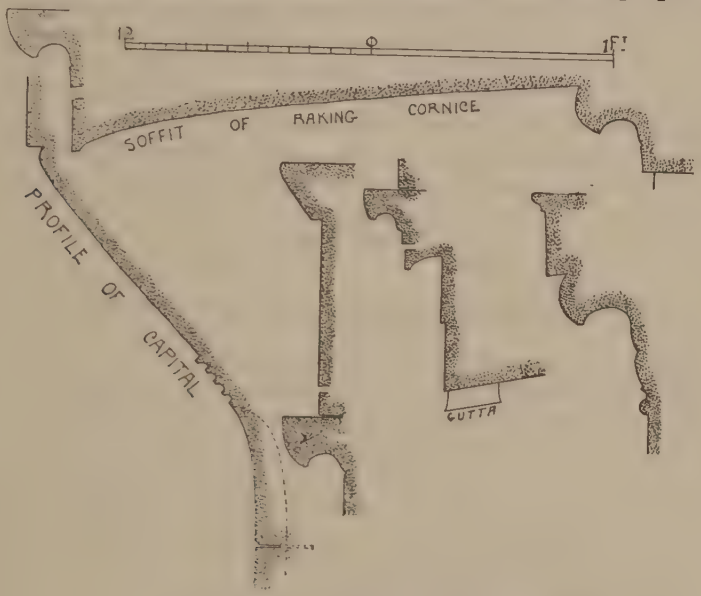
passage. The columns of the Parthenon are nearly 6 diameters in height, and are channelled, like all the Doric columns of the best period, with twenty vertical hollows or *flutes*, a number which has the advantage of bringing a projecting edge under the angle of the abacus (the flat square member which forms the seat of the architrave), and the centre of a hollow of the flute under the

66 End elevation of the Parthenon (438 B.C.)


VERTICAL LINE
31·425
VERTICAL LINE FROM CENTRE OF ABACUS
NOTE: THE THIRD TRIGLYPH IS NOT CENTRAL OVER THE COLUMN
5 4 3 2 1 0
0 5 10 FEET
0 1 2 3 METRES

tendency of a straight-lined tapering column to look hollow to the eye. Such is the Parthenon column ; of all known features in architecture the one on which the greatest refinements in design have been expended.

Above the columns comes the principal beam or architrave, left perfectly plain, as a feature for strength only ; it is formed of three stones placed side by side, though showing on the outer face as a single stone. Above this comes the portion known as the frieze and treated in this order as a series of vertical blocks, channelled to aid their vertical expression, and leaving square spaces



72. Profiles of Mouldings (Parthenon).

between them (*metopes*) which are carved with sculpture subjects in high relief ; the upright pieces (*triglyphs*, from the triple channelling) are the structural portion ; the metopes are comparatively thin slabs, which might be taken out without affecting the construction. Above these comes the moulded cornice which marks the roof. The structure and arrangement of the masonry is shown in Fig. 70.

The representations of the Parthenon Order in some publications illustrating the Orders are not quite accurate ; in particular, the crown moulding of the raking cornice is wrong in many of them, being shown as a conic section curve, whereas in fact it is the only moulding in the building which is a segment of a circle. Fig. 71 is a drawing of the Order put together from Penrose's figured measurements.

The mouldings are among the most remarkable details of the Parthenon. Their profiles (72) are nearly all compound or conic section curves, the only exception being the upper member of the raking cornice of the pediment, which, as already observed, is a segment of a circle. Several of the mouldings

show thin edges and small curves and hollows such as could only be adequately executed in fine marble. This refined character of the sections of mouldings is of the greatest importance, for there is no incident in a building which more emphatically proclaims rudeness or refinement in architectural taste than the sections of the mouldings. No barbarous people have ever made good mouldings ; and to this day coarsely profiled and commonplace mouldings are the mark of bad architecture.

But the refinements of the Parthenon do not end here. The axes of the columns are all very slightly inclined inwards, so as to produce a slightly pyramidal effect, more felt than seen, but sufficient to counteract the known tendency of a square building with vertical walls to look rather larger at the top than at the base. The lines of the cornices and of the steps at the base have a slight upward curve. The felt necessity for this probably arose in the first instance from the effect of the raking lines of the pediment making the straight cornice under them appear hollow. If the reader looks at this diagram of two

raking lines and a horizontal one, he will almost certainly see, even on this small scale, that the horizontal line appears to sag slightly, by contrast with the raking lines. To avoid this effect, the horizontal cornice was slightly curved upward on the end elevations ; the steps of the stylobate were treated in the same way ; and the lines of cornice and stylobate on the flanks were also curved upwards, but to a less extent—there was no pediment angle there to disturb the eye. The amount of curvature of the upper step averages about ·24 of a foot at the ends of the building ; slightly less on the flanks. The angle columns of the building are made slightly thicker than the rest, as objects tend to diminish in apparent size when seen against the light, as compared with similar ones not so seen. Another refinement of perception is seen in the treatment of the projections or *antæ* at the end of the cella walls, which stand opposite to the end columns of the inner colonnade, and carry one end of the beam of the roof of the portico. These being regarded as part of the cella wall prolonged, are given a perfectly different style of capital from that of the column, to mark the difference of their function. In Gothic architecture, where there is a wall capital and a half pier (called a *respond*) taking the springing of the last arch of an arcade, the wall capital is almost always of the same design as that of the pier nearest to it. The Greeks had a keener analysis ; the wall capital was a different thing, structurally, and was to be treated differently.

The triangular space (the *tympanum*) between the pediment and the cornice beneath it, was filled with sculpture completely in the round, and unconnected structurally with the architecture, which formed a frame to it ; the metope sculptures were in high relief, but part of the body of the stone. Perhaps the most beautiful portion of the sculptural decoration was the low-relief frieze which ran round the upper portion of the exterior wall of the cella, just beneath

the ceiling of the portico. It seems at first sight odd that the architects should have placed so beautiful and fine a piece of work in a position high up on the wall behind the colonnade, where one might think there was little chance of seeing it properly ; but in actual fact the keen eye for the æsthetic, so pronounced in the Greek artist, sensed the very position where in the strong reflected light of the southern latitude, the subtleties of the sculpture would be revealed at their best and purest, when they would have been lost in the full glare of the sun.

The employment of colour may have had something to do with this ; for there can be no doubt that the frieze was coloured to a greater or less extent, and the figures relieved against the ground by this means. That the Parthenon was otherwise relieved with colour is pretty certain ; traces of it have been found on some of the ornaments ; but to what extent this was carried it is difficult to decide. Restorations have been made which show the building a perfect riot of strong colours—restorations the very aspect of which is enough to condemn them. Whatever the Greeks of the Periclean period did in the way of polychromy, we may feel sure that it was carried out with the greatest reticence and refinement.

Now here we have something different, in architectural design, from anything hitherto encountered. We are in the presence of an architecture in which details are deliberately shaped and refined, in accordance with an acute intellectual perception, to produce their best and most complete effect on the eye ; in which every detail is an abstract conception of order, form, and proportion ; in which both the shaping hand of the artificer and the seeing eye of the spectator are guided by reason and sensibility rather than by mere habit and tradition. The main forms, taken in the mass, were, as we shall see, traditional ; the treatment and shaping of them in this instance was the outcome of the reasoning power of the architect and his artificers. The introduction of sculptured ornament is governed by the same perception of the reason. Instead of ornament covering all the available surfaces indiscriminately, as in Egypt, it is concentrated on positions in which it will both have most effect and be most in accordance with structural conditions. Features which are doing the main structural work, like the columns and the triglyph uprights, are decorated only in a manner which serves to emphasise their function. Sculptured decoration of the free decorative and expressive class is admitted only in the interstructural portions of the building, where the actual structure can frame and protect it. The different details of the principal features, the column, have a direct meaning and a structural relation to one another. Such a feature as the Susa column would have been too exuberant and unrestrained for the Greek mentality.

Yet in its main features this is a traditional architecture ; in architecture, as already observed, *ex nihilo nihil fit*. And whence came the Doric tradition ? An opinion has grown up, and is persistently maintained in the present day, that the whole of the Doric style is derived from an original wooden construction : that the triglyphs represent the ends of the larger beams, the *mutules* (the projecting square slabs on the under side of the cornice), the projecting ends of the sloping rafters. To the first point it may be objected that the ends

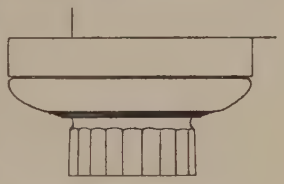
of the beams could only have appeared at the sides and not all round the building ; moreover, that the triglyphs are too deep in proportion to represent exact reproductions of ends of beams. It is quite certain, however, that the builders of the Parthenon, at all events, were not troubling their heads about a stone imitation of wooden construction ; one detail would be conclusive, viz., that the under side of the cornice with its mutule is not of the same slope as the roof rafters. Nevertheless, it is more than possible that from forms which were originally essentials of timber construction sprang as derivatives many of the fully developed stone members of the mature order, not as imitations, but as words from a dead language, giving a subtle and subconscious reasonableness to the composition.

History, after all, has nothing certain to show us. The rock-cut tombs of Lycia do indeed show us stone imitations of wooden construction, in which there are features in the cornice looking very like the reminiscence of rafters ends ; but, from the doubtfulness of their date, we cannot regard these as *origines* ; they imply that there was a previous wooden construction of the same kind in Lycia, though this cannot be connected directly with the evolution of the Doric style. We gather, from the wide spacing of the columns in the Heraion at Olympia, that the superstructure was of wood, but we know not what it was like ; and from that to the earliest stone Doric of which we have intelligible remains, in Sicily and at Pæstum, there is a gap of some five centuries at least.

There is to be observed also in regard to the triglyphs and metopes, that in some of the earlier temples they occur on the wall of the cella as well as in the entablature over the colonnade, and were apparently either used as windows, or at any rate filled with movable slabs and capable of being opened. There is a passage in Euripides in which Pylades proposes to Orestes, in order to carry off a statue from a temple, to get access into the temple by the space between the triglyphs. If these had been the triglyphs over the colonnade, of course they would have been no nearer their object. But in some of the early temples at Selinus the triglyphs occur on the cella walls also, and may have existed in the same position in a non-peripteral temple, and been used as openings. Where the metopes formed part of the entablature over the colonnade, of course there was no object in making them movable, and they became a fixed portion of the masonry, though not forming an integral element in the structural scheme ; they were still panels, which could be cut out without affecting the structure. Professor Hamlin, in his *History of Architecture*, observes of the Selinus temples that " the triglyphs still appear around the cella wall under the pteroma ceiling, an illogical detail destined to disappear in later buildings." Illogical, no doubt, if we imagine the triglyph as a literal imitation beam.

And now to come to the Doric column. The earliest complete example is in the few columns that remain of the temple at Corinth, supposed to be about 700 B.C. ; of the entablature only the architrave remains. These columns are very thick and massive, only about $4\frac{1}{4}$ diameters in height (taking the full height to the top of the abacus), and placed very close together. We find the same characteristics in the temple of Segesta in Sicily (75), and in the temple of

Poseidon (76), and other examples at Pæstum ; these may be somewhat later than Corinth, but they are early Doric ; the columns are not quite so stumpy as those at Corinth, but they are much thicker in proportion than the Parthenon columns, and placed very close. In these examples the whole entablature is preserved, and is as masonic in style as that of the Parthenon, though without the same refinements. In the Pæstum temple referred to, the columns are $4\frac{3}{4}$ diameters high, and are placed so close that the space between the abaci is only two-thirds of the width of the abacus itself. The further we go back in the existing remains of Doric architecture the thicker we find the columns and the closer the spacing. This might be taken to confirm a view that the Doric Order could have had no timber origin, but it must be remembered that a new material would demand a revolution in proportion and would initiate itself on the side of safety, from which early efforts an increasing refinement would follow, as the possibilities of the material became apparent. It is with the massive columnar architecture of the Egyptians that we must connect these massive early Doric columns ; and possibly the Egyptian sixteen-sided columns at Beni-Hasan and later at Deir-el-Bahari may also have had something to do with the origin of the fluting of the Doric column : but the intermediate links are wanting. All we can be certain of is that Doric architecture in its earliest intelligible remains is a completely masonic style. One of the details that bears upon this is that the echinus moulding under the abacus, which assumed such a refined profile in the great Greek period, is in many of these early temples of an outline (73) which would lend itself very well to execution in stone, but is as unlike as possible to anything that it would be natural to execute in wood.

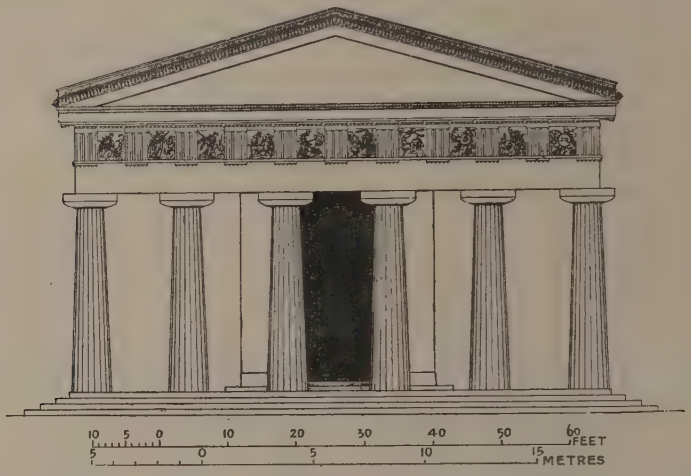


73. Capital of Temple D, Selinonte (Hittorff's Nomenclature).

To revert once more to the Heraion at Olympia, it has been noticed that the remains of the Doric columns there present a curious irregularity in scale and thickness, and Dr Dörpfeld, taking into account Pausanias's one wooden column, has made what is no doubt an ingenious suggestion, that these replaced the wooden columns by degrees, as the latter decayed, and hence were made of the scale which prevailed for Doric columns at the time when each one was erected. This is certainly a most ingenious theory, and one which may be accepted with no little confidence if with considerable reserve. An alternative solution equally probable would indeed be at any rate difficult to discover.

Of the early Doric temples the three great temples at Pæstum are in the most intelligible state of preservation, and the largest shows the unusual arrangement of an uneven number of columns (nine) on each front, leaving a column instead of a void in the centre ; not a sound architectural treatment in a general way, as the column coming immediately under the apex of the pediment injures the balance of composition ; and where there is a single doorway to the cella, it would bring a solid column instead of a void in front of the doorway. Hence the almost invariable arrangement is an equal number of columns on

the fronts, leaving an intercolumniation in the centre. In the example at Pæstum, however, the central column arrangement is deliberately carried out throughout the building ; the portico of the cella has three columns between antæ at the angles, and there is a colonnade down the centre line of the cella, an arrangement which, so far as our knowledge extends, appears to be unique. What special reason there was for this marked and rather extraordinary departure from the usual temple plan it is difficult to conjecture. It has been suggested, however, that this building, sometimes called " the Basilica," was not really a temple at all, but a kind of hall or stoa on a large scale, in which case possible provision was made for a circulation in by one door and out by



74. Temple S, Selinonte ; Hittorff's Nomenclature (7th century B.C. ?).

another in the same portico, the doors being placed to occur opposite symmetrical spaces between pairs of columns. The capitals of this temple are peculiar also, having an ornament in relief carved on the lower part of the large bulging echinus, and a carved leaf ornament round the necking of the column instead of the far more refined and architectural feature of the striation of small channels and fillets, treated with such finish in the Parthenon column, but found in more or less delicate form in the majority of the earlier Doric remains. The columns are short in proportion and with strongly pronounced and quite visible entasis. The temple of Poseidon at Pæstum (76) is in a very good state of preservation, though its columns are also short and thick in proportion (much the same as those at Corinth), showing all the characteristics of true Greek Doric in a somewhat early stage. There can be little doubt that the larger temple, with the centre colonnade, is the earlier building ; both may probably belong to the sixth century B.C., judging from their style, though a later date has been suggested for them by some writers.

75 Interior of Temple at Segesta (7th century B.C. ?)

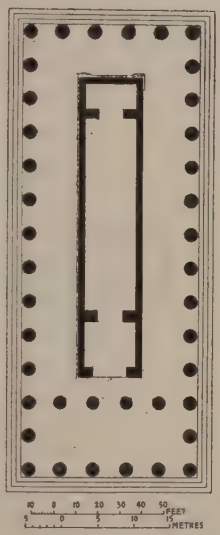
76 Temple of Poseidon, Paestum, from Piranesi (6th century B.C. ?)

77 Existing remains of the Propylæa

78 Columns of the Temple of Jupiter Olympius (170 B.C.)

79 Monument of Lysicrates (*right*)

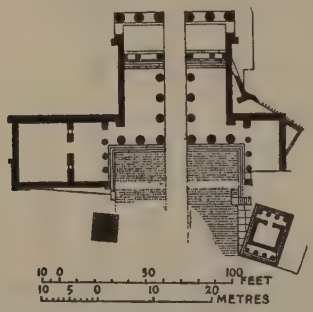
Of the other important early Doric buildings the most noteworthy are those in Sicily. It is supposed that the Dorians from Corinth founded the cities of Syracuse about 730, Selinus (Selinonte) about 630, and Acragas or Agrigentum about 580. At Syracuse there are partial remains of three large temples, from which the plans and architectural treatment can be approximately restored. At Selinonte are the remains of seven temples, one of them of immense size (360 feet by 163), and showing various characteristics of an early phase of the style, in the coarseness of some of the details (the profiles of the echinus, for instance), and the uncertainty of aim as to the proportions of the columns, some of them having so great a diminution that the necking is little more than one-half the thickness of the base (74). A point to be noted in the plans of several of these temples (which have been fully illustrated and restored in Hittorff's great work, *Sicile Antique*) is the extremely narrow proportions of the cella ; in two of them the space between the colonnade and the outer wall of the cella is equal to the interior width between the cella walls. A glance at the proportions of width in the Parthenon plan (63) will show what a remarkable contrast there is between it and these earlier plans at Selinonte (80), where the narrow interior recalls the dark cells at the inner end of an Egyptian temple, while the larger proportions of the Parthenon cella seem to suggest a cult of a more cheerful and less mysterious character. At Agrigentum are the remains of several temples, of which that called the Temple of Concord (68) is in very good preservation, and is a fine example of early but complete Doric. The remains of the temple of Zeus Olympius show it to have been an immense structure of its class, 363 feet by 182, with an order on so colossal a scale that the builders were afraid of genuine lintel construction ; the columns were half-columns built into the wall, and the entablature corbelled out from the wall, which partially supported it, instead of bridging over an empty space between the columns. This temple shares with the so-called Basilica at Pæstum the peculiarity of having an odd number of columns (seven) on the front, and consequently a centre column. Another peculiarity is that these columns, alone of all Greek Doric columns, have bases. The fact of finding them here, in a Doric order of this unusually large scale, is perhaps a confirmation of what has been already suggested, that the omission of the base in the Doric order was to avoid cramping the space for passage between the columns. Where, as in this case, the lower and larger diameters of the columns are 14 feet apart, this practical reason could not apply. Some rather grand sculptured figures of the kind called Telamones—figures designed to act as structural architectural members—have been found among the ruins, but the position they occupied is uncertain. The probability is that they were features in the interior



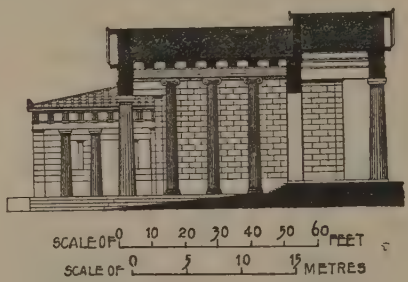
80. Plan of Temple S, Selinonte.

architecture. The temple at Segesta (75), probably about the same age as those at Selinonte, is of some interest; it shows the colonnade and entablature complete, but the columns unfluted, and there are no traces of the cella, which seems never to have been built. It has been rather hastily concluded from this that it was the practice of the Greeks to build the colonnade first and the cella afterwards, but such a practice would be so much at variance with the best methods and conditions of building that it seems highly improbable; it is more likely that there was some local reason for it at Segesta; perhaps shortness of funds, and a desire to make a show in the first instance.

Of Doric temples just previous to the greatest Athenian period there are three worth special mention: the temple of Zeus at Olympia; that of Athene Aphaia at Ægina (formerly supposed to be the temple of Zeus Panhellenius); and that which used to be called the Theseion, but is now believed to have



81. Plan of the Propylæa.



82. Section of the Propylæa.

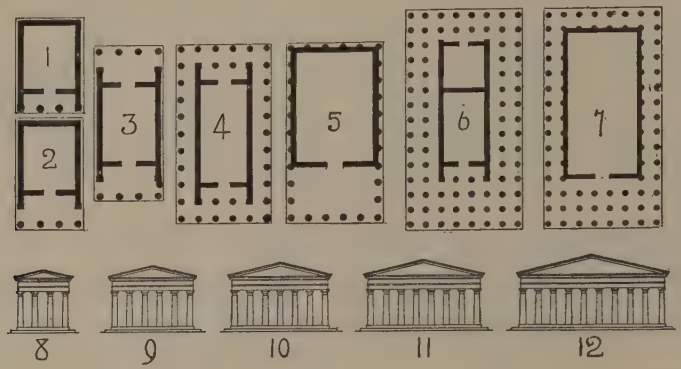
been a temple to Hephaestos, at Athens. This latter (62) is in a very complete state as to its main architectural features. It is a small temple, about 105 feet by 45, with columns about 6¼ diameters in height, and shows some of the same refinements of curvature in the lines which are found in the Parthenon, and one which Penrose discovered and believed to be peculiar to this temple, viz., a slight upward curvature in the raking lines of the pediment. If this is correct, it seems curious that it was not also applied in the Parthenon, as it would seem almost necessary to complete the scheme of optical correction, since the horizontal cornice has an upward curve. In the inner surface of the pediment wall three square holes, one in the centre under the ridge, and one opposite each wall of the cella, appear to have taken the ends of three longitudinal beams (what would now be called *purlins*) for carrying the rafters. As the cella is only 20 feet wide, the walls and the centre purlin would be sufficient to carry the rafters; but as there are no interior columns, and the centre apartment of the temple is 37 feet long between the cross walls, this purlin, about 1 foot 3 inches square, could hardly have carried all that distance without some intermediate support, and the construction of the roof is therefore not quite intelligible.

Besides the Parthenon, there is one other building, mainly Doric, of the great Athenian age, the Propylæa, or portico to the Acropolis (81 and 82), a little later than the Parthenon. Mnesicles is the reputed architect. There is a portico of six Doric columns on the east and west faces, with a much larger intercolumniation between the two centre columns than at the sides, giving access to the central avenue of approach; the west portico is flanked by chambers with a smaller Doric order at right angles to it; but the central alley from east to west is flanked by columns of the Ionic order. It has been mentioned before that the four columns in the centre of the opisthodomos of the Parthenon were possibly Ionic. The temple of Apollo at Bassæ, ascribed to Ictinus (the architect of the Parthenon), and built about the same date as the Propylæa, also combines an Ionic interior order with a Doric exterior order. Now this combination is very significant of the manner in which architecture was regarded by the Greeks of the Periclean age. Like the refinements of detail of the Parthenon, it shows that architectural design with them was not a matter of mere habit and tradition; it was a matter of intellectual choice and perception. In mediæval architecture we never find the details of two styles side by side in buildings of the same period; the design follows the manner of the day implicitly; we date it by the nature of the detail, which would occur at no other date. With the Periclean Greeks it was otherwise. They controlled style; they were not controlled by it.

The reader must not suppose that all Greek Doric temples were, like the Parthenon and Propylæa, structures of finely finished Pentelic marble. The temple at Corinth and those at Selinonte were built of a comparatively coarse stone covered with stucco. Even the later and very important temple of Zeus at Olympia was built of a stone described as very coarse in texture, and apparently difficult to manipulate, and covered with stucco for the finish of details, though the sculptures were of Paros marble. One instance has been found, that of one of the "Treasuries" at Olympia, in which there is evidence that the stones were faced with coloured terra-cotta slabs, many pieces of which were found. This seems, however, to be a solitary instance, perhaps owing to the tastes and habits of the tribe which contributed the treasure and built the house for it. But it is evident that, not so very long before the Periclean period, Greek architecture and its decoration were something very different from that chaste and refined work which we usually think of as associated with Greek art. As Bosanquet observed in an essay on "Greek Temples and Early Religion," "There was the same contrast between old and new on the Acropolis of Athens and at Delphi. The older shrines were small in their dimensions, audacious in their colouring, decorated with all manner of monstrous and vehemently moving forms. If we could set foot in one of the crowded sanctuaries of pre-Persian Greece, with its riot of bright colour and uncouth shapes, we should suppose ourselves to be in some holy city of India, rather than in the Greece which most of us know best by its later, serener, better disciplined creations."

It will be desirable here to distinguish the various arrangements of columns

in Greek (and afterwards in Roman) temples, and the terms applied to define them with convenient brevity :—



83. Different Types of Columnar Arrangement.

1. *Distyle in Antis :* two columns in front between antæ or pilasters forming the termination of the cella walls, an arrangement only used for small temples.
2. *Prostyle :* with columns standing free in front (generally four) and not between the antæ.
3. *Amphiprostyle :* prostyle at both ends of the building.
4. *Peripteral :* with columns all round.
5. *Psuedo-peripteral :* the side columns only attached to the wall, instead of standing free as a colonnade.
6. *Dipteral :* with a double range of columns at the sides.
7. *Pseudo-dipteral :* appearing as if dipteral in front view, but the inner range of columns not continued along the sides, leaving the side portico the width of one intercolumniation instead of two.
8. *Tetrastyle :* with four columns showing on the front.
9. *Hexastyle :* with six columns in front.
10. *Heptastyle :* with seven columns in front (very exceptional).
11. *Octastyle :* with eight columns in front.
12. *Decastyle :* with ten columns in front.

The origin of the Ionic order is no more certainly traceable than that of the Doric ; there is nothing like a series of examples showing its development ; there are a few sparsely scattered examples showing this form of capital with the spiral volute at each side in a very crude stage, and with no attempt to connect it in an artistic manner with the shaft of the column. One such inchoate Ionic capital was found by Flinders Petrie at the Greek colony of Naukratis in Egypt (of which, however, the actual volute is not preserved, and is only conjecturally restored) ; and one was found at Delphi, considered to be a votive column from Naxos (84) ; a point to be noted, since Naxos is geographically as much connected with Asia Minor as with Greece. Messrs Anderson and Spiers consider the Naukratis capital (650 B.C.) as the oldest Ionic capital known ; but the internal evidence of the Naxian capital at Delphi would point to its being older ; it is at all

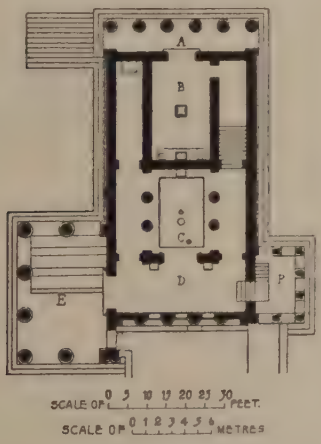
84. Votive Capital from Naxos (700 B.C. ?).

events much more naïve in design; there is no attempt, as in the Naukratis example, to "stop" the fluting at the top of the shaft, which runs right up under the leafage.

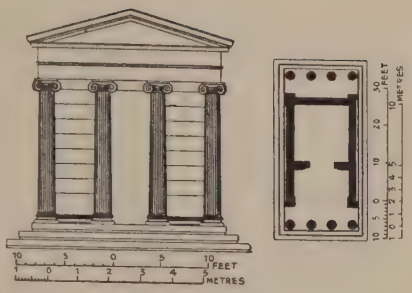
The earliest known example of the Ionic style as developed into a finished artistic form by the Athenians is the small amphiprostyle temple on the Illissus (85, 87), destroyed in the early

85. Capital of Temple on the Ilissus.

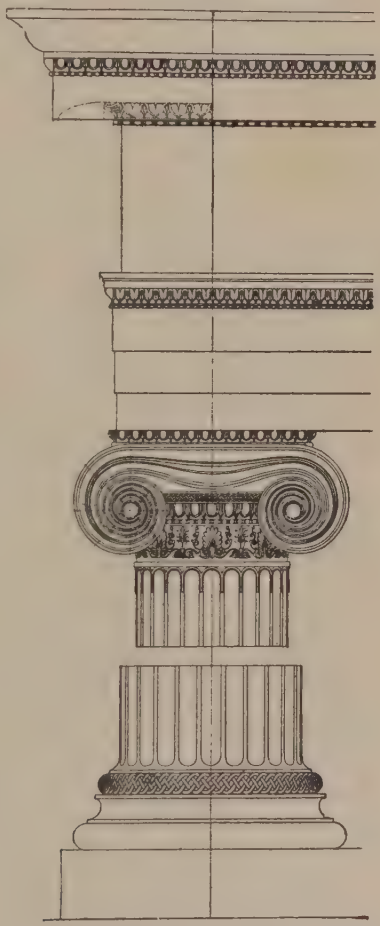
part of last century, but of which complete illustrations exist. It is as nearly as possible contemporary with the Parthenon. A still more refined example is the Ionic portion of the Erechtheion, about twenty years later. In the capitals of both (85 and 88) it will be seen that the curving-over leafage ornament of the archaic capital has become a more systematised



86. Plan of the Erechtheion.



87. Ionic Temple on the Ilissus (480 B.C. ?).



88. Ionic Order of the Erechtheion (420 B.C.).

repeating ornament, in which the lower part of its curved section is turned inwards instead of outwards, and follows the plan of the shaft of the column, from which it is, however, separated by a fillet or (in the case of the Erechtheion column) by a band of carved ornament.

The Erechtheion stands alone among known Greek buildings for its irregular plan (86), arising from the combination of three small temples in one structure. Its architectural treatment is as free and unfettered as its plan. The Ionic porticos at A and E are entirely different in arrangement and effect, and the smaller portico (F) has, in place of columns, those noble and dignified draped female figures (caryatides), one of which is now in the British Museum, having been replaced by a cast on the actual building—a rather flagrant proceeding ; the cast surely should be in the Museum and the original *in situ*. Figs. 105, 106 show the existing remains of the Erechtheion.

The Ionic order is in every way a more graceful and delicately proportioned architectural scheme than the Doric. The columns are more slender in proportion ; those of the Ilissus temple are 8¼ diameters in height (reckoning the height always as including the base and capital) ; those of the Erechtheion 9 diameters ; those in the Hall of the Propylæa 10 diameters, as if there were a desire to make the greatest contrast between the massive Doric of the exterior order and the slenderer proportions of the columns which only flanked the passage-way, and helped to support the roof. Being of smaller proportions and also—from the lighter form of the entablature—permitting of wider spacing, the Ionic column admitted of a base, which its narrower proportions also seemed to require to give it a firm seating on the step. The flutings are twenty-four in number in place of the Doric twenty (there being no prominent angular projection of the abacus in this case), and are cut rather deeper, and with a fillet left between them, in place of the sharp edge of the Doric fluting. The heavy abacus of the Doric capital finds no place here, but as the form of the capital with its curved volutes would make an unsuitable seat for the architrave, which would appear to crush the volutes, a thin moulded abacus is inserted between the capital and the architrave, which takes the weight of the entablature over the central part of the column, leaving the volutes free. In the architrave of the Erechtheion, as well as in that of the little amphiprostyle temple of Niké Apteros (107), outside the Acropolis enclosure, we see the first examples of that sense of fitness of structural proportion which induced the Greeks to divide the architrave into three slightly receding faces by successive sinkings of the surface ; practically the architrave stones had to be the same depth as in the Doric order, to be strong enough to carry over the opening, but as they had a lighter column under them, they were lightened in appearance by this simple device. Above the architrave comes, as before remarked, the horizontal band of masonry called the frieze, taking the place occupied by the Doric triglyphs and metopes, and in general a field for bas-relief sculpture, though in the Erechtheion it was left plain.

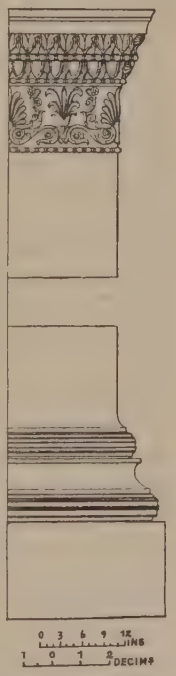
The defect of the Ionic capital is that it is only a satisfactory design in its face view, the side view giving us the pillow-like roll of the outside of the volute, which has a heavy and awkward appearance, and there cannot be a

doubt that this capital was originally evolved and used for columns between antæ, as seen in the archaic rock-cut façade at Telmissos in Asia Minor (89), when it was not required to be used as an angle column at all; it is, so to speak, a one-way capital only. When, therefore, it was used in prostyle or peripteral temples, it was necessary to modify it by turning the outer volute at an angle of 45°, and making it do duty for both faces; but the result is not very satisfactory. In the temple of Apollo at Bassæ (about the same date as the Erechtheion) an almost special form of Ionic capital was designed (90), which, though less refined than the Erechtheion capital, undoubtedly lends itself better to the double facing and the angle treatment of the volutes.

89. Ionic Rock-cut Façade, Telmissos.

As in the Doric style, the capitals of the antæ on the cella, which answered to a column facing them, were treated quite differently from those of the columns, and had no volutes. The capitals of the antæ at the Erechtheion (91) are of singular beauty and refinement of detail. This restoration of the head and architrave of the doorway shows several characteristic features of Greek ornament—the alternating foliage ornament on the cornice; the "egg-and-dart" and the "bead-and-reel" ornament on the bed moulding; and the ornament of circular pateræ on the architrave or framing of the doorway may remind the reader that we have already come across a similar ornament, but in greater profusion, on the architrave of a Persian doorway (40).

90. Ionic Capital at Bassæ (430 B.C.).



91. Capital and Base of Anta, Erechtheion.

In spite of the fact that the oldest specimens of the Ionic capital in its crude form have been found on Greek soil or in a Greek colony, the probability is that the form originated in Asia Minor. There is a quasi-Asiatic stamp about it. That it was the favourite form in Asia Minor appears from its use in the two greatest and most sumptuous

temples known on that coast—those of Diana at Ephesus and of Apollo Didymæus at Miletus, and also in that remarkable erection the Mausoleum at Halicarnassus. The archaic Ionic capital from the older temple of Diana at Ephesus (650 B.C.), now in the British Museum, is the earliest example of a complete and architecturally designed Ionic capital, and is marked by a certainty and precision of line which implies long previous acquaintance with the form, and is very different from the crude examples of Delphi and Naukratis. The form of the Ionic capital does not suggest a timber origin. It comes far more easy and natural to carve a spiral out of granular stone than out of a fibrous material like wood, with a grain dominant in one direction. Moreover, a spiral bent *downwards* from a horizontal line across the top of the capital, is a radically different thing from a spiral developed *outwards* from a line rising from the necking, as in the archaic capital from Golgos (92) in the Louvre. That type of capital, of which there are other archaic examples, springs from quite a different *motif* than that of the normal Ionic capital. Nor is the constant recurrence of stone-carved spiral ornament in Pelasgic and Mycenæan art, already noted, to be forgotten. The spiral carved in stone was a familiar and widespread ornament long before the earliest Ionic capital that we know anything of. The origin of the Ionic spiral may possibly be traced to such archaic spiral ornaments as those from the Treasury of Atreus now to be seen in the British Museum. These at all events are very ancient spirals executed in stone.

92. Archaic Capital from Golgos (Louvre).

Of other buildings in the Ionic style of which intelligible remains are left, the temple of Apollo at Bassæ (430 B.C.), the Ionic capital of which has already been mentioned, deserves special notice for its peculiarities of plan and design, indicating that adherence to precedent was not really so rigorous with the Greek architects as the general similarity of their plans might lead us to suppose. Externally this is a Doric temple ; internally it has the Ionic colonnade already mentioned, but the columns are connected with the main cella walls by cross walls of which the half-column forms the end or facing ; the last of these cross walls is at an angle of 45° with the main walls (there is no obvious reason for this most unusual arrangement) ; the temple fronts north and south and has a side door facing east into the lateral colonnade. A Corinthian column, which stood on the central axis at one end of the cella, was probably a votive column and of later date than the temple. The great temple of Diana at Ephesus (356 B.C.), was dipteral on all four faces, with an immense order of Ionic columns (61), the capitals and bases of which, in the British Museum, astonish the modern spectator, accustomed to the less ambitious scale of our own modern columnar architecture, by their immense scale and boldness of design and execution. A certain number of these columns—the reading of the account is open to question as to the exact number—had the lower drum decorated with beautiful sculpture in low relief, and stood on square pedestals with sculpture in higher relief ; at least, as far as the remains preserved can show. An

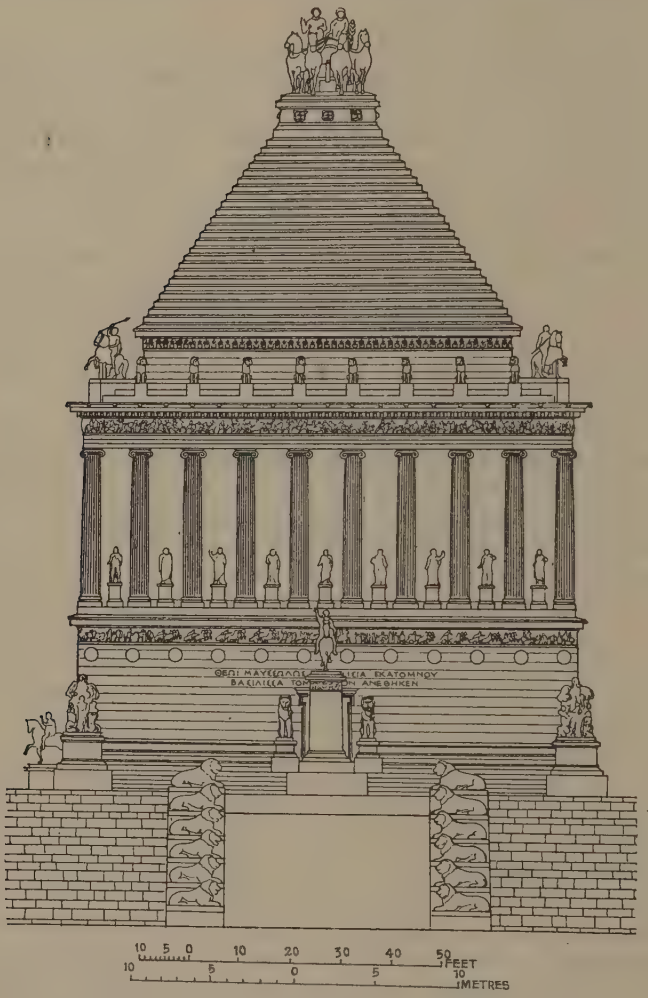
extraordinary point about this temple is the great size of the openings between the columns. The centre intercolumniation on the front was wider than the rest (an unusual feature), and was no less than 23 feet between the abaci, an immense space to be bridged over by a single block of marble. Altogether, it was a work of giants in building.

A still larger temple in Asia Minor, that of Apollo Didymæus at Miletus, built probably soon after the temple at Ephesus, was rather similar to the latter in its dipteral plan, but had a very deep pronaos or vestibule with three successive ranges of four columns each, and the unusual feature of a comparatively small chamber between this and the naos, supposed to be the chamber in which the oracles were delivered. Among the peculiarities of its detail a base was discovered (58) of which the lowest member is a twelve-sided slab carved with small bas-reliefs on each face. It seems pretty obvious that this temple was built as a rival to that of Ephesus. Other temples of importance, of which there are more or less remains, are that of Apollo Smintheus in the Troad ; that of Athena Polias at Priene ; that of Cybele at Sardis ; and a late one to Jupiter at Aizani, in Phrygia, of which there is a capital of special design to which we shall have to return (page 82).

Another celebrated monument in Asia Minor with an Ionic order was the Mausoleum at Halicarnassus (350 B.C.), of which the remains were excavated and brought to England by Newton, and are now in the British Museum. Pliny gives a description of this which is not very intelligible, but which leads to the conclusion that there was a lofty podium with a columnar stage above it, and on that something in the nature of a pyramid with a quadriga on the summit. Enough of the quadriga has been found to restore it with something like certainty. An expression of Martial about the upper portion " hanging in empty air " leads to the conclusion that the pyramid was carried entirely on columns, with no solid building under it. Various attempts have been made to restore the Mausoleum from Pliny's description, but none of them will correspond in every sense with the remains in the Museum. A puzzling fact is that two sets of steps have been found, one with a broad tread, the other with a very narrow one. Stevenson applied both these to the crowning pyramid, placing the broader steps in the lower part and the narrower ones above ; but this pyramid with the broken line looks so bad that it is hardly possible to accept it. The wider steps probably formed part of the pyramid ; the narrower ones may have formed a stepped base to the podium. Bernier's restoration, though contradicted in some details by the actual remains, probably comes nearest to the general outward aspect of the monument, but the massively built cella of his restoration is quite out of keeping with Martial's expression above quoted and is therefore omitted in the illustration (93), which gives Bernier's columnar order only, with no indication of a solid building in the rear.

Why the Corinthian order, with its foliated capital, should be so called, is not very apparent. Vitruvius indeed asserts that it was " invented " by Callimachus of Corinth, but we know that important architectural features have seldom or never been actually invented by one man ; there are always

prior stages leading up to them. Anderson and Spiers suggest that as Callimachus is referred to by Pausanias as a worker in metal, he perhaps executed capitals of this type in Corinthian brass, and hence got the credit of inventing



93. The Mausoleum at Halicarnassus, Restored (350 B.C.).

them. The capital from the Tholos at Epidaurus (59), which may be about 400 B.C., does give, in the treatment of the angle volute, a kind of suggestion of a metal original, but it is the only known Corinthian capital that does. That at Bassæ, probably earlier, is quite sculpturesque in character. We should be disposed to see in the Corinthian capital a suggestion taken from the spreading form of capital of the Egyptians, with the leafage which is flat in the Egyptian

capital worked up into greater relief and freedom of line in materials and in a form of leafage more especially Greek. If we imagine that early experiments of this kind were made in metal, that would account for the greater freedom and relief of a leafage which could in that case be made separately and riveted on. But this is only conjecture; we have only the results in marble. The most important Greek example of a Corinthian order is the little circular Monument of Lysicrates at Athens (79, 95), with six columns, which, though only showing externally as half-columns, are complete shafts, the wall between being built against them, and the stones cut to fit round them. It is possible that it was at first intended for an open shrine, and that the closing walls were an afterthought. The capital, though very graceful, has not the completeness and unity of design of the Corinthian capital as we find it in the remains of the great temple of Jupiter Olympius, the first example of the Corinthian capital in the form which became traditional (94). This, though the temple was founded under Roman influence (174 B.C.), was almost certainly the work of Greek artificers. The Monument of Lysicrates does not differ materially, in the other details of the order, from the Ionic order; and bearing in mind the single (apparently votive) Corinthian column at Bassæ, and the fact that the Lysicrates' Monument was also a memorial, we may accept the idea of Choisy that, with the Greeks of the great period, the Corinthian capital was a kind of decorative fantasy, used for special reasons on special occasions, and not regarded as a serious element in their architecture. In the Corinthian capital the abacus again appears as an important member, but in a more decorative form than the Doric abacus: moulded, and with a plan with convex sides and projecting angles. The volutes under the angles and supporting them are no doubt a suggestion from the volute of an angle Ionic capital, though kept to smaller

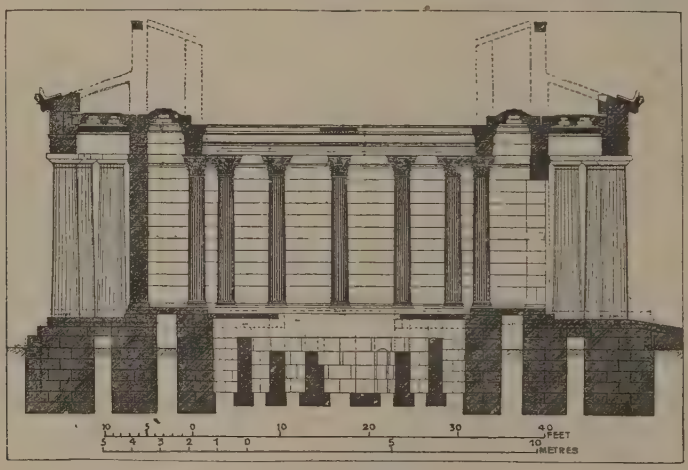
94. Capital, Temple of Jupiter Olympius, Athens (170 B.C.).

95. Capital and Entablature, Monument of Lysicrates (335 B.C.).

proportions so as not to seem too heavy for the leafage. The roof of the Monument, in one stone, is decorated with most beautiful wreaths of conventionalised foliage (96), supporting some crowning feature which has

96. Scroll Ornament from Monument of Lysicrates.

disappeared, and has been restored on paper in various forms. The cornice shows, like many of the Ionic temples of Asia Minor, the use of those repeated small blocks called *dentils*, invaluable for giving a sparkle of light and shade to the work ; but which, whatever may be thought of their original meaning as the ends of rafters, had long before this subsided into a purely ornamental feature.

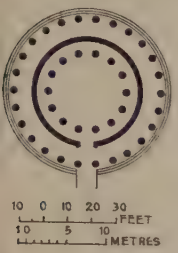


97. Section of Tholos at Epidaurus (400 B.C. ?).

This little erection, which has become famous all over the world, is a remarkable example of the fascination of architectural beauty and refinement of design even on a small scale.

Among other Greek examples of the Corinthian order were two circular buildings, a form unusual in Greek plans—the Philippeion at Olympia, commenced 339 B.C., which had an outer peristyle of Ionic columns and an order of Corinthian columns projecting from the internal face of the wall ; and the Tholos (a general term for any circular building) at Epidaurus (97 and 98), with

an external peristyle of Doric columns and an interior circle of Corinthian columns, the capital of which (59) has already been referred to. Bearing in mind that the Lysicrates' Monument also is circular, we are confirmed in the idea that with the Greeks the Corinthian column had some special application to special classes of buildings. There is also the small late octagonal Tower of the Winds at Athens, attributed to the first century B.C., the now destroyed porches of which had capitals (99) which may be classed as Corinthian, but in which the reference to Egyptian forms is more obvious than in any other Greek capital. Other capitals of similar design were found in the theatre at Athens, and are now in the Museum, and Texier gives one (100) from a temple *in antis* at Patara; so that this form was obviously not so exceptional as was formerly supposed.

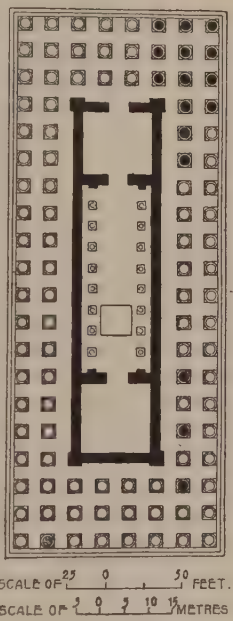


98. Plan of Tholos at Epidaurus.

99. Capital, Tower of the Winds (80 B.C. ?).

Fellows, in his *Asia Minor*, gives a sketch of the remains of a large Corinthian temple at a place which he calls Labranda; but on Greek soil there were no Corinthian temples on a large scale except the great one of Jupiter Olympius on the plain near Athens, which may be classed as Greek work though, as already said, founded under Roman influence. This, if it was ever entirely finished, which seems doubtful, must have been a temple of the greatest magnificence. The plan (101), as restored by Penrose, shows an octastyle dipteral temple, about 360 feet long by 145 wide, with columns three deep at each end; the columns, of Corinthian order (78), being 6 feet in diameter and 55 feet high. The cella, it may be observed, was a comparatively small one, buried deep, as it were, amid the forest of columns, sixteen alone of which remain standing.

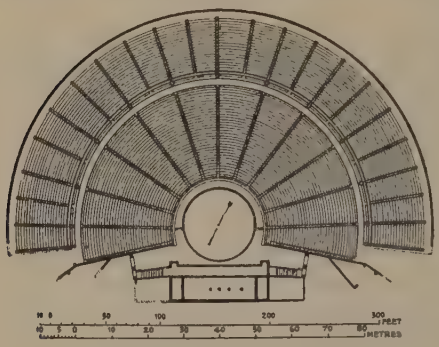
100. Capital from Patara.



101. Plan of Temple of Jupiter Olympius, Athens.

In addition to the temples, we find among the remains of Greek buildings *stoæ* or porticos, generally long narrow buildings with a long range of columns in front, the plans of several of which have been traced both at Argos and Olympia. There was also the Hall of the Mysteries at Eleusis, of which the plan only has been recovered; an exceptional building for Greece, square on plan, with forty-two interior columns spaced at equal

distances over the floor, built by Ictinus, the architect of the Parthenon; a portico of twelve columns having been added to the front at a later period. Eleusis also had its Propylæa, greater and lesser, of which the former is said to have been copied from the Athenian Propylæa. Greek theatres, which were numerous, do not much affect architectural development, as the auditorium was always formed in a sloping hollow which was filled with ranges of stone or marble seats, and the only architectural detail was in the permanent scenarium screen; of these nothing of importance is left. Fig. 102 shows the typical Greek theatre plan; the auditorium seats generally extended somewhat beyond the half-circle, so as to form a horse-shoe plan; the "chorus" who take the part of commentators on the incidents and characters of the piece, performed their evolutions in the central circle.

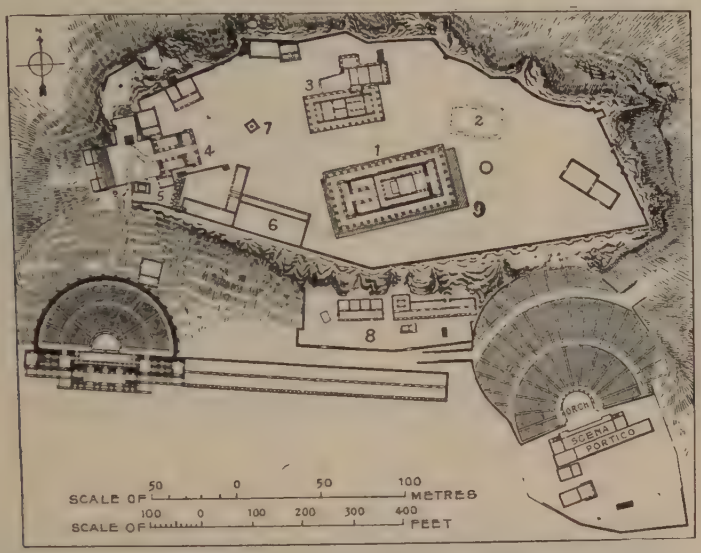


102. Greek Theatre Plan.

It has been pronounced by Dr Dörpfeld that the Greek theatre has no stage, and that the principal actors mingled with the chorus in the orchestra—the floor space within the curve of the auditorium seats. There does not seem to be any real evidence for this, except a reference in one play to the position of the altar to Bacchus (supposed to have been placed in the centre of the orchestra), which may be open to more than one interpretation: and the theory is quite at variance with the idea of effective representation of the Greek tragedies as they have come down to us in literary form. If there were no stage, and all the action took place in the orchestra, why are the auditorium seats always stopped short in a horseshoe curve (or occasionally in a semicircle), as seating for an audience all looking one way, towards what took place at the side where the seats break off? Why is the place not a complete amphitheatre, if all the acting was to go on in the central space? Every one who has seen Greek plays acted at the Bradfield theatre, with a low stage in front of the scenarium, and with steps down to the orchestra, on the generally assumed Greek model, must have recognised how completely this arrangement fits the action of the plays, and the relation between the principal actors and the chorus.

It should be realised that the great temple centres of Greece almost always included, besides the main temple, a host of smaller erections—stoæ, shrines, treasuries, votive columns, perhaps two or three smaller temples; the whole forming a sacred enclosure within a boundary wall. Such assemblages of buildings existed at a very early period at Argos; later at Olympia, at Delphi, Pergamon, Eleusis, and other places. The most interesting to us, though by no means one of the largest, is the Acropolis at Athens, which is to Greek architecture what the Forum Romanum is to Roman architecture. This, entered by the Propylæa, contained the

arthenon ; the Erechtheion ; the high altar of Athene ; the colossal statue f Athene Promachos, looking towards the Propylæa ; the Chalcotheke or easure-house, practically a stoa with a long colonnade in front of it ; and o doubt many other shrines and emblems of which no trace is left now. he plan (103) gives a general idea of the arrangement of the buildings. It ill be observed that the temples are not placed parallel or in any symmetrical elation to one another ; but the area of the whole rock is irregular in shape,



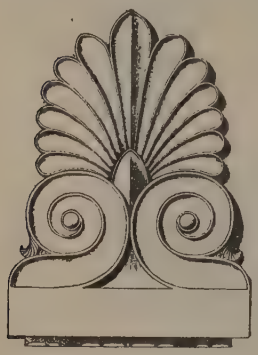
103. Plan of the Acropolis, Athens.

1, Parthenon ; 2, Platform on which stood the Great Altar of Athené ; 3, The Erechtheion, and the old smaller Parthenon ; 4, The Propylæa ; 5, Temple of Niké Apteros ; 6, The Chalcotheke, or Treasure-House ; 7, Colossal Statue of Athené Promachos ; 8, The Pinakotheka ; 9, Substructure of Cimon.

so that there is no suggestion in the site for an axial line. It has been supposed by Penrose and others that the Parthenon was orientated toward the rising of some special star ; but this theory seems to have been pushed rather further than proof can sustain it. Outside the boundary the little temple of Niké Apteros is again quite skew to the lines of the neighbouring Propylæa, perhaps owing to conditions of site. (This little temple was actually demolished in comparatively recent times, but has been put together again, all but the cornice.)

Greek architecture was very restrained in its use of ornament, which was never realistic in its imitation of Nature. In the Doric style the nearest approach to an ornament of floral character was in the *antefixæ* (104) which decorated the ends of the ridges on the roof between the flat tiling (70), which show a

series of lobes branching from a centre in a manner suggested by, but not imitating, floral growth. A similar *motif* was carried out in a richer and more elaborate manner in ornaments forming finials to stelæ or pediments. The gutter spouts on the cornice were formed of conventionalised lions' heads. The square-lined "Greek fret" or "key-pattern," as it is sometimes called, which is a favourite ornament up to the present day, was probably only used in Doric as a painted surface ornament. Parts of the cornice of the Parthenon, however, appear to have been painted with graceful repeating or alternating ornament of a similar conventional character to the antefixæ; some of these are exceedingly similar to painted ornament found in Egyptian work. The Ionic style admitted carved repeating ornaments, of which the most common is that known as the egg-and-dart enrichment; but alternating ornaments of this type took various forms, and it has been noticed that their lines, as seen in elevation, generally present curves similar to that formed by the section of the moulding on which they are carved. There is also the bead-and-reel ornament often used to line out the lower edge of a moulding and give a little sparkle to it; this is also used in the Doric style. These ornaments imitate nothing; they represent only the abstract qualities of repetition and contrast. There is also on the necking below the capitals of the Erechtheion a little very delicate carved ornament of a floral type, but highly conventionalised. The upper member of the base of the Erechtheion columns is enriched by a pattern of interlacing bands; and the architrave of the doorway is decorated with equally spaced rosettes or pateræ, which, as already noticed, recall similar ornaments both in Pelasgic and Assyrian architecture. The ornaments in the Corinthian style (except, of course, the capital) differ little from those in buildings in the Ionic style.



104. Antefixa from the Parthenon Cornice.

We have devoted a good deal of space, considering the limited proportions of this book, to Greek architecture, although its remains are far less numerous than those of Egypt or Rome, because it represents the highest intellectual refinement of the art of architecture, and is in fact the fountain-head of nearly all the subsequent architecture of Western civilisation. Both Roman and Byzantine details are mainly Greek details modified, and the Corinthian capital is the parent of all Gothic carved capitals down to the end of the mediæval period.

Pausing for a moment between Greece and Rome, which represent the two great columnar styles of the world, the reader should bear in mind that there is a quality in these two styles which places them apart from all other architecture, viz., that all the parts are considered and proportioned in reference to the whole. Within certain limits, the same may be said of all examples of fine architecture in every known style, but the statement has a special significance

105, 106 The Erechtheion, Athens (*right*)

The Caryatid Porch of the Erechtheion (*above*)

107 Temple of Niké Apteros, Athens (460 B.C. ?)

108 Temple of Fortuna Virilis, Rome (*c.* 100–80 B.C.)

109 The Maison Carrée, Nîmes, (*c.* A.D. 120)

in the case of the Classic Orders. Broadly speaking, whatever the size of the order, the individual members would bear the same relation to a common unit for each composition, so that whether the colonnade was 50 feet high or 20 feet, the cornice would be varied to relate to the remainder of each order. This particular interpretation of the meaning of proportion is not quite in line with that found in other styles of architecture. In Gothic work, for instance, we find an identical member used in compositions of vastly different size and scale.

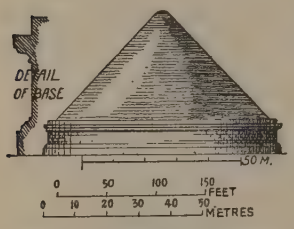
The more or less rigid rules governing the Classic Orders, as set down by Vitruvius, have been a ruling factor in design from the Renaissance down to modern times. Their influence is not only upon columnar architecture, but may be traced in many a severe façade in which the column unit is reflected only by a plain group of two or three stories, and in which the classic cornice is all there is to remind literally of the derivative order.

Even in modern work of a very free type, in which there is little obvious relation to columnar architecture, the traditional subdivision into parts that reflect the pedestal, column, entablature, and balustrade may be detected even though in design such an influence may be quite subconscious and natural to the designer. A sound knowledge of the Classic Orders and of the proportions of their parts is therefore a very firm foundation upon which to base a feeling of proportion without which design of simple or complicated subjects is impossible to achieve with any degree of success. It must, however, be clear in the mind of the student that such study is merely a foundation and not an end in itself for the purpose of vain repetition. The Classic Orders are composed with a special view to the harmonious relations of all the parts, and in the case of Greek buildings of which the order remains complete, this desired harmony *is* in fact produced, and vindicates itself to the eye even if we do not know exactly by what process of reasoning it was obtained. And it is this fact which makes the study of the Classic Orders so invaluable as a training in architectural perception. It is true that unintelligent use of the Orders is out of place in modern buildings erected for very different purposes ; that it only produces an academic architecture and of no real vitality. But there is nothing like these same Orders for training the eye and taste.

Before considering the Roman columnar style as it has influenced the history of architecture, we must glance at the architectural remains, such as they are, of the region of Italy north of Rome and once known as Etruria, which was the neighbouring power, and the chief power with which the Romans came into conflict during the early days of the Kings and the Republic. In a sense, the Etruscans may be said to have been to Roman architecture what the Pelasgi were to Greek architecture ; and, like the Pelasgi, their origin and race connection are rather obscure. And in what is left of their buildings there are points in common with Pelasgic architecture. Though their wall-building was mostly in coursed masonry of large stones, there are occasional examples of the random masonry in large polygonal blocks which is characteristic of Pelasgic building. They made use, in openings for doorways especially, of

the pointed arch with horizontal courses which is so frequent in Pelasgic or Mycenæan masonry. On the other hand, they were perfectly acquainted with and frequently made use of the true arch, in semicircular form with radiating voussoirs. It is even supposed that the celebrated arch of the Cloaca Maxima at Rome, with its concentric rings of voussoirs, was built either by Etruscans or under Etruscan influence. A somewhat similar sewer arch, in one ring with very large voussoirs, is found on Etruscan ground, at Marta.

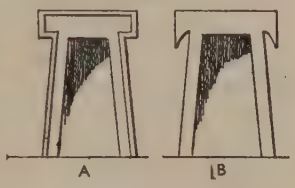
The most numerous remains of Etruscan building were in the form of conical circular tombs with a vertical podium at the base (110), not infrequently lined out with mouldings of somewhat crude and awkward section, in some cases unlike any architectural mouldings found elsewhere. Canina's large work, *Antica Etruria Marittima*, gives the fullest illustration of the remains, though the student must be careful to distinguish between his facts and his restorations. Besides the numerous circular tombs, there are at Norchia rock-cut façades of tombs which show a crude classic form; a colonnade of circular unfluted columns, with capitals approximating to the Doric form of echinus and abacus, and closed at each angle by a square pillar suggesting an anta, but with the same form of capital as the columns. Above the architrave are triglyphs and metopes, and a pediment finish; and there are dentils cut in the horizontal cornice, as in some of the Lycian tombs. The relation of such details to other architectural history is somewhat puzzling; it is in part a question of dates, which are somewhat uncertain; but the probability seems to be that these crude forms of Doric are copied from earlier and more complete Doric in southern Italy. The arch at Perugia, restored by Augustus after its destruction in 40 B.C., confirms this idea of the imitation of Doric, as the triglyphs are here represented by dwarf Ionic pilasters, adopted apparently in preference to triglyphs. (There is the question, however, whether the restoration of Augustus exactly represented the original work.) A tomb at Cervetri shows crude suggestions of Ionic capitals, with the volute, however, springing from the necking of the column instead of forming the termination of a horizontal member of the capital. A still more curious example is the capital at Vulci figured by Canina (111), which looks like a kind of crude attempt at a Corinthian capital, with a head carved in the middle. Thus we seem to find in Etruria crude forms both of the Ionic and Corinthian capital; and yet there can be no kind of doubt that the Ionic and Corinthian Orders of the architecture of Imperial Rome were derived from the Greeks. What there may have been of such details at Rome before the Imperial era, and whether the Etruscan details mentioned were in the nature of cause or effect, there



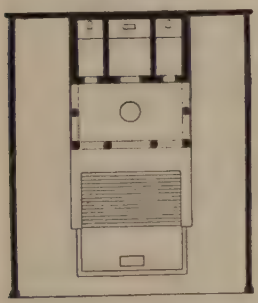
110. Etruscan Tumulus at Assio.

111. Etruscan Capital, Vulci.

seems to be no evidence to show. And yet there is the curious fact that in late and highly ornate Roman work there are found Ionic capitals with a head carved in the centre between the volutes (111), the same type as the Etruscan capitals in a much more elaborate form ; perhaps the only instance in which we can really trace to a possible Etruscan precedent a piece of Roman decorative detail. There is, however, another detail, not exactly to be called decorative, which is found in Etruscan work, and reappears in Roman work. This is the form of architrave moulding round a door, shown in the accompanying sketch (A, 112), which is extended in a square return beyond the width of the door head, and then follows the sloping lines of the door jamb. This is not an uncommon form in Etruscan remains : Fergusson figures one example from a tomb at Castel d'Asso, and Canina has adopted form B in his restoration of what he assumes to have been the typical form of an Etruscan three-celled temple. An architrave exactly similar to form A occurs in the Roman circular temple at Tivoli. And it is worth note that this form of architrave moulding for doors and windows, with the jutting-out return at the top, has come down to us, through Roman and Renaissance architecture, to the present day, when it is constantly used by modern architects for the mouldings round windows in buildings of classic type. But its origin goes back to ancient Etruria.



112. Etruscan Door Architraves.

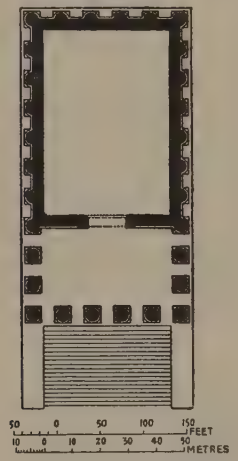


113. Plan of Etruscan. Temple.

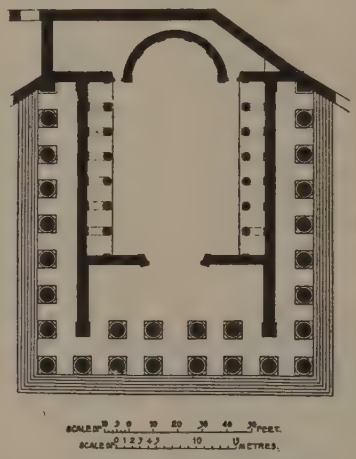
As already implied, the Etruscans were rather tomb-builders than temple-builders ; but some record seems to survive of temples of a peculiar plan, with a broad shallow cella divided into three parallel chambers, and a colonnaded portico in front. This is the form of which Canina gives the supposed plan and elevation in his restoration mentioned above. In this (113) the cella occupies the whole width but only about half the length of the entire temple area, with a tetrastyle portico in front, spaced widely for a wooden entablature, and returned at each side towards the cella. This plan of temple, as we shall see, was not without its influence on Roman temple-planning.

Although Roman columnar architecture, as far as style is concerned, is entirely founded on Greek, and forms indeed a kind of continuation of the latter in a spirit of greater lavishness of display and inferior refinement, and though the architecture of Imperial Rome, as far as we know, owed little to Etruria in the way of architectural detail, it is probable that before the Imperial era the architecture of Etruria and Rome was carried out on very much the same lines. The Roman buildings of the period are gone now, obliterated by the architectural glories of the Empire, yet there are certain points in which

Etruria probably permanently influenced the architecture of Rome. It is probably to the Etruscan familiarity with the use of the arch that we owe the fact that the architects of the Imperial era erected buildings with vaulted roofs on a large scale, instead of accepting the Greek position of avoiding the arch altogether, and confining themselves to the narrow spaces capable of being bridged by stone lintels or wooden beams. It is probably to the example of the podium round the base of the conical tombs of the Etruscans that we may trace the Roman habit of elevating their temples on a comparatively lofty podium, in place of the two or three low steps which formed the base of the Greek temple. It is certainly to the influence of the circular Etruscan tombs that is due the not infrequent choice of the circular form in Roman temples and other buildings. It is true that Greek circular buildings are occasionally



114. Plan of the Maison Carrée, Nîmes.



115. Temple of Mars Ultor, Rome.

met with, as at Epidaurus, but they are unusual and probably built for exceptional reasons; but among Roman buildings we have the Pantheon, the circular temple at Rome (page 87) and the similar one at Tivoli, and the tomb of Cecilia Metella, which indicate an evident leaning towards the employment of the circular plan. There is another point in which Roman temple plans seem to have been influenced by Etruscan, viz., the comparatively wide proportions of the cella. The further we go back in the history of the Greek temple, as a rule the longer and narrower we find the proportions of the cella. The Etruscan temple, as we have seen, was a temple with a shallow and wide cella with a considerable space of colonnade before it. These proportions of plan and portico survived more or less in the plans of the Roman temples, presumably as the result of similar religious tradition. The cella was shorter and wider than with the Greeks, and there was a tendency not infrequently to make it the full width of the portico, merely carrying the columnar Order along the sides as engaged columns. We see this last arrangement in the temple

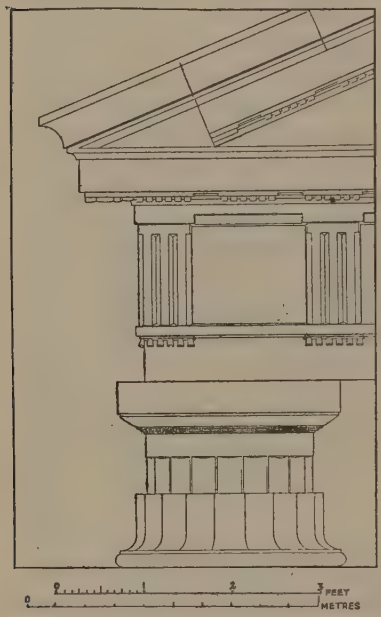
of Fortuna Virilis (108), in the temple of Saturn, and in the Maison Carrée at Nîmes (109 and 114); and in the temples of Mars Ultor (115), and of Castor and Pollux, although these are peripteral temples, we cannot but observe how wide and short are the proportions of the cella as compared with that of any Greek temple. And that peculiarity is almost certainly due to the persistence of what may be called the local temple plan originated in the neighbouring and closely connected region of Etruria.

There could hardly be a greater contrast than meets us in the manner in which architecture is represented in Greek and in Roman work. In Greece we had to do with an intellectual people of great refinement of taste, who would hardly admit an ornament in their architecture unless it were the best, and whose architectural genius was almost entirely expended on the building of temples. With the Romans we come on the work of a conquering race, possessed of less æsthetic refinement, if of more vivid imagination, and who desired above all things a rich and sumptuous effect in their buildings, and whose architectural achievements, though they included many temples, extended also to every kind of building work which could be required either for public use or for ostentation. In this respect, indeed, Rome furnishes an entirely new departure in architectural history. The vast architecture of Egypt was entirely that of temples; the Chaldæans and the Assyrians produced an architecture of fortresses or of fortress-like palaces; the Persians an architecture of palaces; with Imperial Rome we meet the remains of architecture applied to every purpose which public and private life on a scale of magnificence demanded: temples, theatres, baths, basilicas, palaces, triumphal arches, aqueducts, all go to swell the great spectacle of Rome's architectural magnificence.

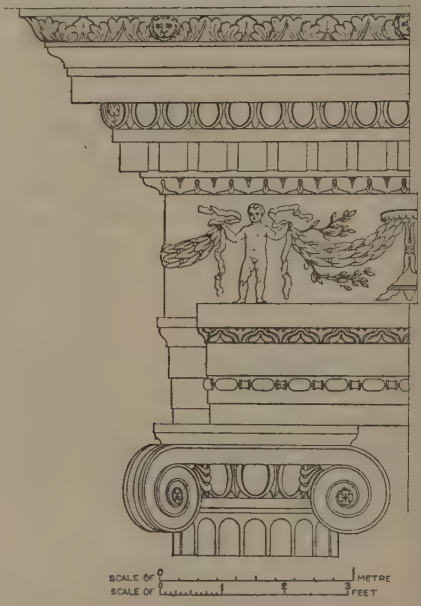
We may consider the temples first, however, because it is in these that the use of the columnar Order is most predominant, and it is important to recognise in what manner the design and use of the Roman Orders differed from those of their Greek originals. Vitruvius, the great authority on the Orders, recognises five columnar Orders—Tuscan, Doric, Ionic, Corinthian, and Composite. Of the Tuscan there is no ancient example. It appears to have been a perfectly plain and severely designed Order, with absolutely no ornament but mouldings; the column a plain shaft with an abacus and moulding under it, a small moulding as a necking, and a circular moulded base. The superstructure is described as wooden, which allows of course of a much wider spacing of the columns than with a stone architrave; but it is remarkable that Vitruvius, while he gives the proportions for everything else, says nothing as to the width of the intercolumniation, so we may conclude that this was left to convenience and the size of the temple. The Renaissance architects made their own Tuscan Order, with a stone entablature; Palladio allows an intercolumniation of four diameters width. Those who wish to see what an impression of severe dignity can be obtained with this Order can study it in the portico of Inigo Jones's church in Covent Garden.

The Roman Doric was very different from the Greek: it has none of the

delicate profiles and fine adjustments of the latter. The most typical example is perhaps that of the Theatre of Marcellus ; the capital is barely reminiscent of the Greek Doric, with a quarter-circle moulding instead of the more beautiful hyperbola curve of the Greek echinus, and three large receding fillets in place of the small delicate necking mouldings of the Greek column. The shaft might be fluted or not ; the Marcellus example is not, and has no base, which was probably the rule, though it may have been optional, as Vitruvius says nothing of a base to the Order ; Normand figures an order found at Albano,



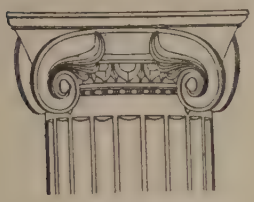
116. Roman Doric Capital and Entablature : Temple at Cora (80 B.C. ?).



117. Roman Ionic Order : Temple of Fortuna Virilis (early 1st century B.C.).

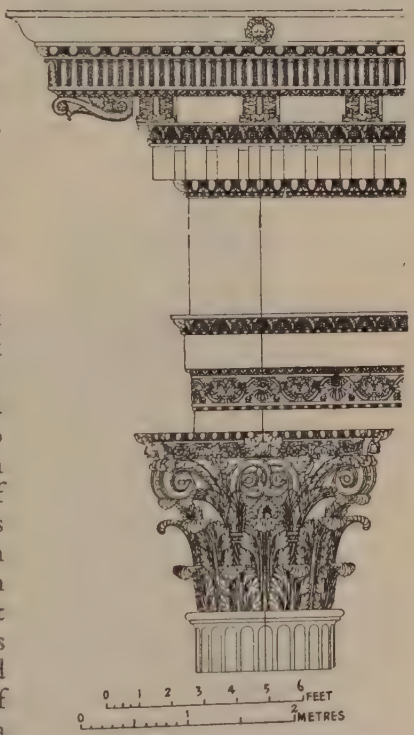
in which the column curves out into a fillet at the base. In all the older text-books of the Orders the Roman Doric is shown with the outer triglyph removed from its proper position at the angle, and placed centrally over the angle column. The only remaining example of Roman Doric, the Temple at Cora (116), does not show this practice ; but it was probably done in other buildings now destroyed, or the Renaissance architects, who copied Roman precedent, would not have adopted it. The Greek method of placing the two end columns, next the angles, a little closer together, solved the problem of the regular spacing of triglyphs from corner to corner instead of from end column centre to end column centre, though the æsthetic reason for this change in spacing of columns no doubt had a much deeper significance and illustrated the perfect incidence of Greek thought.

The Roman Ionic differed less from the Greek Order of the same name; but the capital (117), with its straight lines and small volutes, is a less satisfying feature compared with the fine sweep of line and elaborated volutes of the best Greek examples. As in the apparently solitary Greek example at Bassæ, the Roman Ionic capital was occasionally modified so as to act as an all-round capital, all four volutes being at an angle of 45° with the abacus, as shown in the capital from Pompeii (118). The entablature of the Roman Ionic has much more ornament than the Greeks allowed, and in many cases it may be said that the Romans carved on a moulding ornament which the Greeks would only have indicated in colour.



118. Ionic Capital from Pompeii.

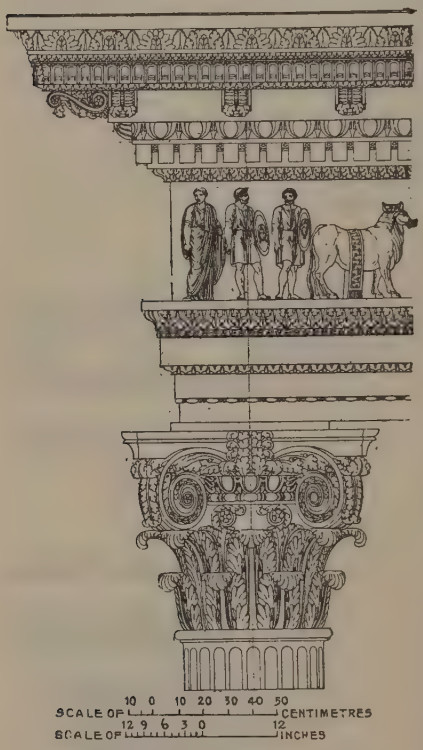
The Corinthian Order was the favourite with the Roman architects, and their treatment of it is typical of the whole spirit of Roman art, in its richness, costliness, and exuberance of ornament. The note sounded by the highly decorative character of the capital is maintained throughout the decorative carving of the entablature. Taylor and Cresy's detail of the entablature from the Forum of Nerva, if authentic, is a characteristic example of Roman exuberance. The fact that the Temple of Jupiter at Athens is without this exuberance of ornament, the entablature being in fact quite plain, is an additional reason for thinking that the building was the work of Greek artists, not of artificers sent from Rome. The Order of the temple formerly called Jupiter Stator (119), but now supposed to have been a temple of "the great Twin Brethren," shows a better disposition of ornament, and the capital may perhaps justly be said to be the finest known example of a carved capital. The column in the Roman Corinthian Order might be either fluted or plain; and it is rather curious that, though one would think the highly decorative character of the capital and entablature demanded a corresponding treatment of the column, the Roman architects were rather fond of leaving the shaft of the column plain, perhaps with the idea that this gave more value, by contrast, to the carving of the capital and entablature. It should be noted also that the Romans, instead



119. Roman Corinthian Order (Temple of Jupiter Stator).

of being content with the Greek plan of building up a column in a succession of jointed " drums," preferred where possible to use monolithic shafts, which has no doubt a more monumental effect, and it may be taken as a sign of that developed æsthetic sense possessed by the Romans as by the Greeks, if expressed in different directions.

The Composite Order (120) differs from the Corinthian only in the design of the capital, in which large angle volutes, imitated from the Ionic capital, are inserted above the Corinthian leafage. Messrs Anderson and Spiers have, however, pointed out that it had a precedent in the capital of the late Greek Temple of Jupiter at Aizani, Asia Minor (121), already referred to (page 67); a curiously abnormal pro-



120. Roman Composite Order; Arch of Titus (A.D. 75 ?).

121. Capital, from Temple of Jupiter, Aizani (1st century B.C. ?).

duction, in which the Ionic volute is joined to what looks like a Corinthian capital with the upper tier of acanthus leaves omitted. The Composite capital compares unfavourably with the true Corinthian capital in which the angle volutes have the scale and the look of " spring " in them which harmonises with the whole character of the work; and few will share Fergusson's opinion that " the greatest defect of the Corinthian capital is the weakness of the small volutes."

The modifications made by the Romans in the details of the Greek Orders, however, are not of so much importance, in an architectural sense, as the radical change which they made in the manner of using the columnar Order. With the Greeks the column was a genuine structural feature, standing separate and carrying the superstructure. Of the two important exceptions to this rule, the great temple at Agrigentum employs engaged Doric columns because the scale was too great (or thought to be so by the builders) to venture on a

122 Interior of the Great Hall, Baths of Caracalla ; as restored by Cockerell (early 3rd century A.D.)

123 Temple of Venus, Baalbec (*c.* A.D 200. ?)

124 Circular Temple in the Forum Boarium, Rome (*right*)

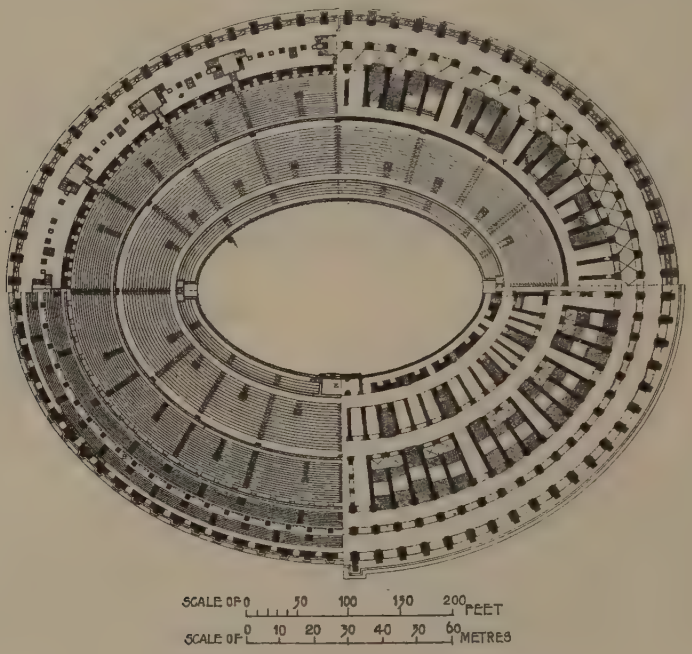
125 The Arena at Verona (*c.* 50 B.C.–A.D. 60)

126 The Colosseum, Rome (A.D. 80)

complete column and lintel construction ; and the Monument of Lysicrates, as already remarked, from the manner in which the intervening walls butt against the columns, may have been intended at first to have an open colonnade. In a general way, it is certain that to employ columns, originally designed as structural features, to form ornaments planted along a wall which was structurally complete without them, would have been a proceeding quite foreign to the bent of the Greek mind. But to the Roman architects, who had taken the Greek columnar Order as their model, it appeared that the employment of this form of design constituted in itself the art of architecture ; accordingly, when erecting such buildings as the Colosseum and the Theatre of Marcellus, (127) which were of arched construction, they planted half-columns all round the exterior, appearing to carry entablatures which were really carried by the arches between the order, and which divided the building into so many stories, a different order of column being used in each story, by way of a picturesque variety ; Doric or Tuscan being used in the ground story, Ionic above, and Corinthian above that. Thus the Greek orders, or passable imitations of them, instead of being integral elements in the structure, became only a kind of scenery planted on to a building with which they had no real structural relation, much as may be their abstract significance. It is possible —indeed, not unlikely—that this Roman fashion of applying the columnar Order as a wall decoration was one of the indirect results of that wider proportion of the cella of a temple which has been already noted as a probable legacy of the Etruscan plan. Thus, in the Temple (so-called) of Fortuna Virilis, which is credited to the early part of the first century B.C., the wide proportions of the cella precluded the carrying round of the colonnade so as to form a peripteral temple ; and the desire to retain, nevertheless, the dignity of effect of the peripteral form, may have led to the architect thinking, in this and other similar cases, " if there is not room for the actual peripteral colonnade, let us have at least the show of it." Vitruvius, in fact, says this almost in so many words : " Alii vero removentes parietes ædis et applicantes ad intercolumnia, pteromatos spatii sublati efficunti amplum laxamentum cellæ." This treatment may be taken to have indicated the first introduction into architecture of the

127. Structure of the Theatre of Marcellus (13 B.C.).

spirit of academical pretension. It will be noted that in the Colosseum the entablatures are carried round in unbroken continuity of line, thus presenting fine curves to the eye, instead of being broken into projections above the caps of the columns. Whereas when they came to use columns as the supports of the vaulting in the great halls of the thermæ, unable apparently to conceive the column apart from its entablature, and not recognising that in this case the vault formed the superstructure which the column was to carry, they inserted a section of entablature—architrave, frieze, and cornice—above the column, the vault springing from that (see Fig. 122, where this device is clearly

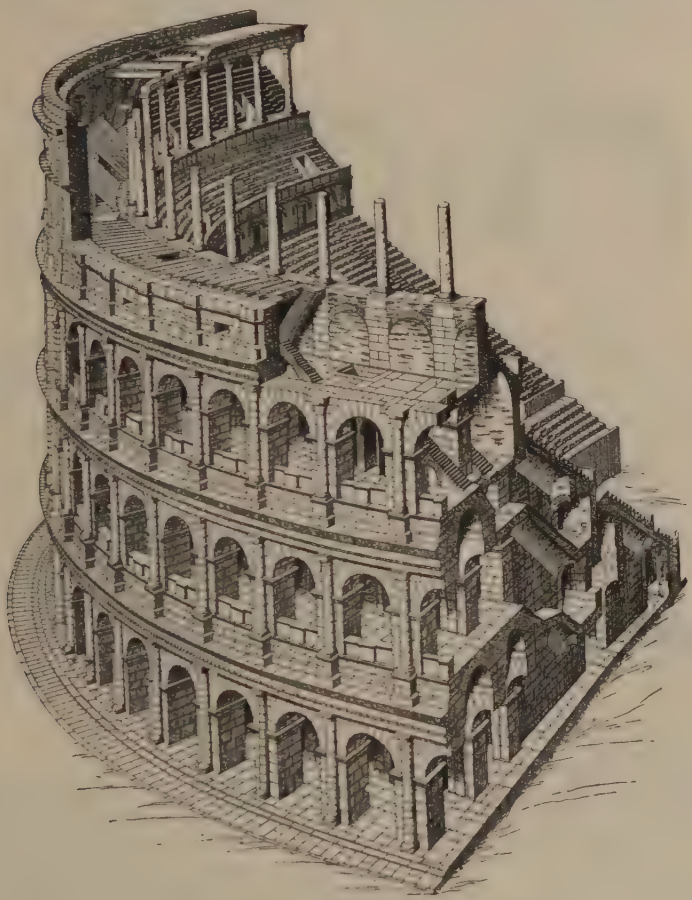


128. Plan of the Colosseum (A.D. 80).

illustrated in Cockerell's drawing). In combining the expression of arched construction with the remains of lintel construction, they revealed a new facility in composition of which use has been made to the present day.

Adopting the columnar Order from the Greeks, the Romans inherited the arch from the Etruscans, and employed it largely in its typical form of a built arch with radiating voissoirs of masonry, as in the openings in the walls of the Colosseum and other structures of the kind, and in the construction of their numerous triumphal arches. But their use of the arch, or the arch form, in roofing, was influenced by their command of special material suitable for a special method of construction, which rendered them to a great extent independent of the actual principle of arch construction, and which in fact affected their whole method of building. There existed in large quantities, in the

district around Rome, an earth called *pozzolana*, which, when mixed with lime, yielded a remarkably hard and durable cement, by means of which masses of wall and roof could be made in a concrete which, after having time to set, was practically monolithic. Thus, in the building of walls, the main bulk of the wall would be a mass of concrete, and then faced with the thin

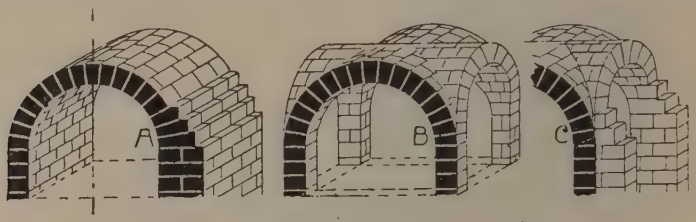


129. Isometric Section of the Colosseum.

triangular bricks embedded, point inwards, in the concrete, to form a sightly exterior surface, upon which again, in buildings of superior importance, would come a decorative facing of marble. Whether the concrete mass was cast in wood shuttering or what other method was adopted is not certain. Before this use of concrete became general, unburnt brick was largely used in ordinary buildings; and the late Professor Middleton, whose valuable book on Rome is mainly occupied with the study and illustration of the building processes

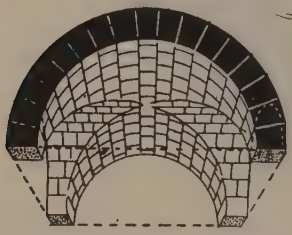
employed, notices that in what we should call the "Building Act" promulgated under Augustus, there was a provision limiting the thickness of street walls to two feet, a provision which would have compelled the builders to have recourse to the stronger material, as the crude brick walls of that thickness would not have stood to any great height.

The effect on the roofing of great buildings of the use of this practically monolithic cement was that vaults could be constructed over large spaces



130. Barrel Vault and Cross Vault.

without exercising any outward thrust on the walls other than that imposed by the natural elasticity of the material—slight it is true, but not to be ignored, particularly where no reinforcement of great tensional strength is used. The principle of the arch, and the necessity for having an immovable abutment at its springing, have been briefly explained already (see page 41). Where there is a continuous arched roof over the whole length of an interior (what is called a "barrel vault"), it would be necessary to have the walls for their whole length of sufficient thickness to resist the thrust of this vault, as at A, Fig. 130. But if the roof be formed with a series of semicircular vaults intersecting the main barrel vault at right angles, the result will be a series of diagonal arches crossing each other (B), and the wall will require to be strengthened only at the points where these arches meet against it (C). This is important to remember, because upon this fact, as we shall see, depends the whole problem of Gothic building. The interior view of such a vault would be as shown in Fig. 131. The Romans employed cross-vaulting on this system in roofing the great halls of their thermæ (see again 122), but they employed it apparently not for constructive but for æsthetic reasons; they continued to employ a columnar order in the interior of the hall, and this was the only way in which they could establish a direct relation in design between the vault and the column. But these vast Roman vaults exercised comparatively little thrust; they were solid casts in concrete, faced afterwards with marble or bronze; had they been articulated arched vaults they would have pushed the walls out. The only exception is in the late building called the Basilica of Maxentius, in which there are cross walls behind the columns which would have acted as buttresses



131. Aspect of a Simple Cross Vault.

132 View of the Forum Romanum (reconstruction)

133 The Forum to-day, showing (*left to right*): Temple of Vespasian (A.D. 81); Arch of Septimius Severus (A.D. 203); Temple of Saturn (various dates) (*foreground*): the Forum; Temple of Antoninus (A.D. 141); and the Colosseum (A.D. 72–80)

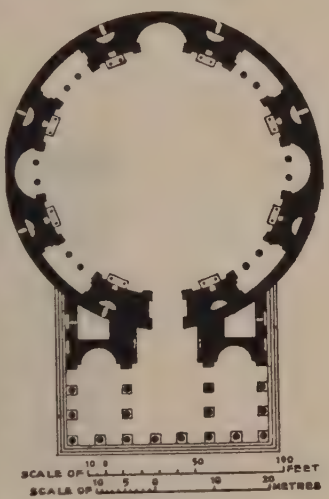
134 The Portico

135 Inside the Rotunda

THE PANTHEON, ROME (*c.* A.D. 130)

had the roof been really an arched vault. The Basilica of Maxentius, in fact, represents the construction of an early mediæval building, with its cross-vaulting pressure and its buttressed walls.

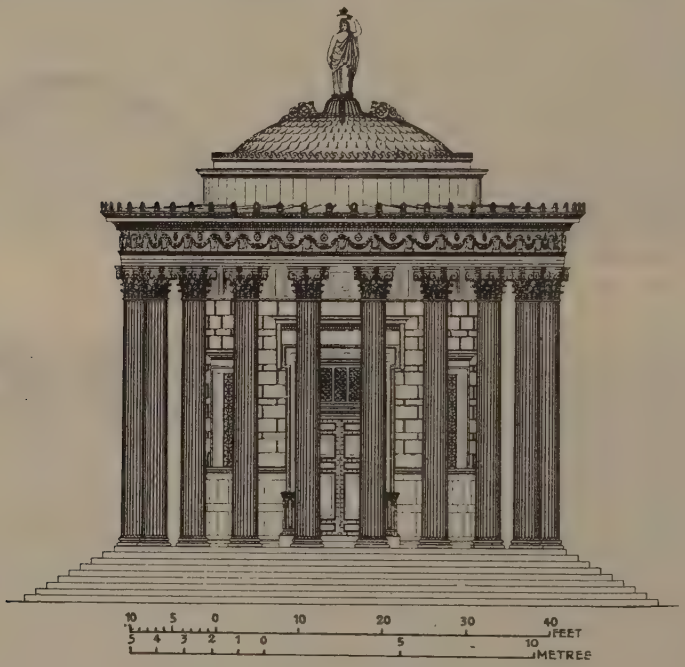
The vault is the monumental manner of roofing a space which is a parallelogram ; the dome is the monumental way of roofing a circular or a square space. The problem of building a dome, which must be circular on plan, above a square compartment is one, however, which the Romans, as far as existing remains attest, never faced ; we must wait for a later period for that. There is no doubt that they would have carried it out successfully had the problem appealed to them, but their Etruscan tradition predisposed them to circular rather than square plans, and their one great dome, that of the Pantheon, one of the finest in existence, is erected over a circular plan (136). The history of this great building was long misunderstood ; it was attributed to an earlier period than it really belongs to, and it is only since the French architect, Chedanne, obtained permission to examine it thoroughly that it had been proved that it was really erected by, or in the time of, Hadrian, and that the fine portico which has been attached to it, and which bears in an inscription the name of Agrippa, was originally the portico of a decastyle temple erected by Agrippa, taken down and re-erected as an octastyle portico in front of the Pantheon. The details of the reasoning by which this conclusion was arrived at we cannot follow out here ; it must be sufficient to say that they are now accepted as historical fact. It may be added, however, that traces have been found of a circular *place* (probably surrounded by a colonnade) which formerly existed at a few feet lower level than the present floor of the temple, the existence of which very probably suggested the erection of a building in that form. But the most curious misconception about the Pantheon was as to the construction of the dome. With the knowledge of the habit of the Romans of building vaults in solid concrete, it was assumed that the Pantheon dome was of that class of construction ; and even an observer usually so cautious and accurate as Professor Middleton ventured to assert that the relieving arches apparent in the outer wall were only surface work and had no structural importance. But Chedanne, who obtained leave to cut into the interior surface of the dome at some points, while some repairs were going on, discovered that these arches, which occur over each of the recesses or chapels in the internal wall, go right through the wall and are vertical, and form, in fact, a kind of base for the springing of the dome, and that the dome, so far as he could examine it, is built in brickwork, in thin courses laid nearly horizontally,



136. Plan of Pantheon (*circa* A.D. 130).

with a slight dip outwards. The theory that the dome is a solid mass exercising no thrust may be true in as far as this, that it must be mainly owing to the excellent quality of the cement used by the Romans that such a construction could be possible and permanent.

Though the Pantheon, lighted by its one great circular opening at the top, is still one of the grandest and most impressive of interiors, its present condition presents little of its former glory. Externally it was originally faced with marble, and the dome probably covered with gilt metal plates ; internally

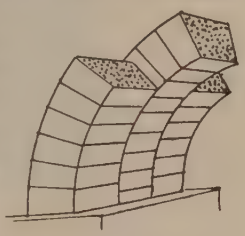


137. Restoration of Circular Temple, Rome.

there was a great deal of marble panelling which has been removed ; the coffers in the dome had gilded bronze centre flowers ; the bronze cornice to the centre opening still remains. Fergusson's opinion that the division of the wall treatment into two stories is a weak point in the interior design is one not upheld by the considered opinion of the present day, and it is rather felt that the grand scale of the simple domical surface is enhanced by this deliberate limitation of scale in the substructure. Without doubt the Pantheon is one of the world's greatest interiors (135).

Of the other notable circular buildings of the Romans, the earliest known is the Tomb of Cecilia Metella, which originally no doubt had a conical roof ; the most remarkable is the Mausoleum of Hadrian, now called the Castle of St Angelo, and transfigured quite out of recollection of its original aspect.

Many who see its huge picturesque mass, with all kinds of mediæval alterations and additions, do not realise that this was once a stately classic structure surrounded by an Order of columns, and with a great conical roof. The Tomb of Augustus in the Campus Martius, of which a full description is extant, was originally on much the same lines ; a conical tumulus laid out as a terraced garden with symmetrically planted shrubs. Such buildings, however grand in scale and effect in comparison with their architectural ancestors, were manifestly survivals of the tradition of the Etruscan circular tomb, with its podium and tumulus. Whether the small circular temple at Rome, formerly called Temple of Vesta (124 and 137), and the somewhat similar one at Tivoli, can be referred to Etruscan precedent, is doubtful ; Vitruvius, it is true, recognises the circular temple as coming under the head of Tuscan architecture : " fiunt autem ædes rotundæ " (lib. iv., cap. 7). There is one small circular temple at Baalbec (123) which is unique in design among classical buildings, having an entablature planned in concave curves, forming at their meeting a series of projections beyond the line of the cella wall, each supported by a column standing free ; a very elegant and charming design which Chambers took as a model for a charming pavilion in Kew Gardens.



138.

In building their arches and vaults the Romans probably used from the first what we have observed was the western system, of erecting temporary centering, as opposed to the eastern practice of building without centering, in such a manner that each ring of an arch was more or less supported by the previous one. It is probable that in some cases an open system of brick arches was erected first which would give sufficient support to the frame for casting the concrete, in which the brickwork would afterwards be embedded. Choisy describes an arch in the Pont du Gard, which shows three courses of voussoirs side by side with a straight joint between, as in Fig. 138, and argues that this implies a system of building it as so many contiguous arches, one being completed first, and then the same centering used successively for the others. The method may have been employed where for any reason there was difficulty in procuring timber for centering, but it is a very bad way of building a stone arch, as there is no cross bond, and any settlement would tend to pull the arch-rings apart from each other. Choisy gives another example (which, however, he does not attempt to date) from an amphitheatre at Lambesa, N. Africa, where there are deeper arch-rings at regular intervals, on which the lighter slabs of the roof rest. Something similar is seen in the remains of the Thermæ of Diana at Nîmes, where there is a stone-arched barrel vault with deeper ribs at intervals, springing from columns ranged against the cella wall, but not engaged in it. This, which is probably a late building, is very interesting as being a kind of first hint of the future employment of the supporting ribs for vaulting, which became such an important feature in Romanesque architecture.

It would be impossible, within the limits of this work, to mention specially the many temples of the Romans of which remains are known. But two, in addition to those already alluded to, deserve mention. One is the double Temple of Venus and Rome, at Rome, built by Hadrian, with two cellæ with apses placed back to back, a portico with four columns and antæ before each temple, and a complete peristyle enclosing the whole. It was, with its unusual dual plan, one of the largest and most remarkable of the temples erected in Rome. The apses still stand, and are decorated with a cross network of ribs forming coffers between ; a mode of decoration very characteristic of Roman architecture, producing a certain richness of effect in a manner which required little exercise of thought or design. The walls of the cellæ are very thick, faced internally with columns, and it seems probable that the cellæ were vaulted with a barrel vault with a decoration similar to that of the apses. No Roman temple except the Pantheon has retained its roof, so that we are left to conjecture as to the design of the roofs ; but it seems probable that, as seen internally, they generally showed flat ceilings with coffers. The other temple, or group of temples, which demands a word, is the great architectural group at Baalbec, of late work (the entrance vestibule or Propylæa is said to date from A.D. 212). The vestibule, approached by three vast flights of steps 150 feet in width, is wide and shallow, stretching each side beyond the line of steps, and led to a great hexagonal hall with a colonnaded compartment in the centre and a colonnade round the sides ; this formed the approach to an immense square court, with a colonnade and exterior buildings round three sides, and at the farther, the open side, axial with the court, stood the peripteral Temple of the Sun. The whole columnar architecture was Corinthian, but of a rather coarse type ; but the architectural scheme as a whole is one of the most stately that has ever been conceived. One feature for which the temple has become celebrated is the presence, in the podium at the upper (west) end of the temple, of three enormous blocks of stone, each over 60 feet long and 12 feet by 11 feet thick, set end to end amid masonry of smaller stones. The meaning and object of these has been much discussed, but they may have been merely the advertisement of an enterprising quarry-owner or contractor. If this was indeed so, a fourth stone of similar size remains at the quarry, which they have been either unable or unwilling to incur the cost of moving.

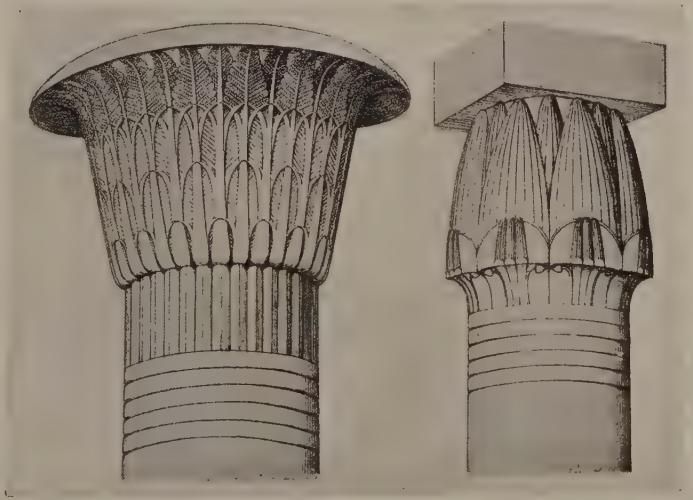
Coming to buildings other than temples, one important type, the Basilica, formed an adjunct of the Roman Forum. As already observed, the original Roman Forum, always referred to as the " Forum Romanum " (132) was to Rome, to some extent, what the Acropolis area was to Athens ; and the buildings erected on it were placed unsymmetrically for the same reason as those on the Acropolis, viz., that the boundaries of the site itself were irregular, and afforded no suggestion for an axial line in any one direction. When, however, the planning and building of some new forum became the ambition of one emperor after another, these architectural groups, on selected areas, were planned with the rigid symmetry which was natural to the Roman mind. The Forums of Julius Cæsar, Augustus, Trajan, Vespasian, and others formed

139 Arch of Augustus, Susa (A.D. 8)

140 Arch of Constantine, Rome (A.D. 312)

141 Roman Scroll from the Forum of Trajan (early 2nd century A.D.)

142 Capital of the Pantheon, Rome



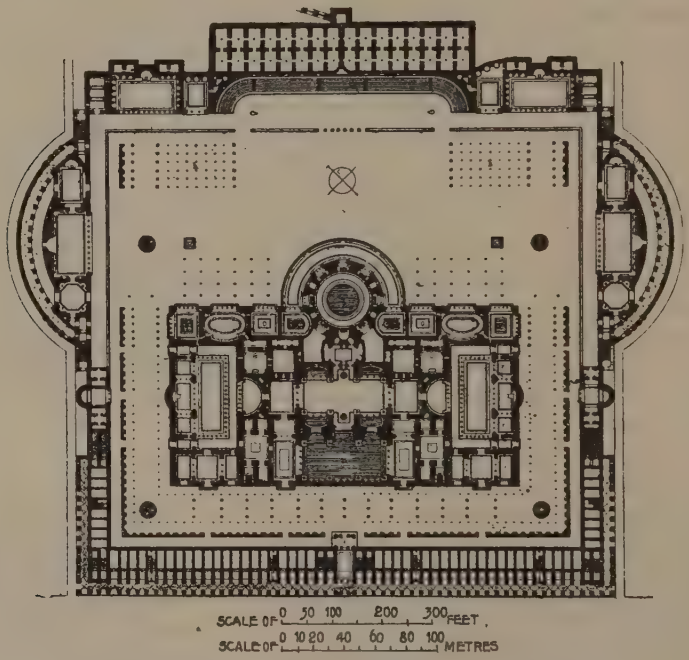
143 Late Egyptian Capitals at Philæ (3rd century B.C.) (*left*)

a kind of small town of themselves, in the neighbourhood of the Forum Romanum. Generally there was a temple either at the end or in the centre, on the axis of the enclosure. The largest, however, that of Trajan, included no temple, but had a semicircular bay at each side, and an immense basilica running across one end, beyond which stands the well-known column with the spiral bas-reliefs of the campaigns and victories of Trajan.

The Forum Romanum is flanked, on the south side, with sufficient remains of the Basilica Julia, which appertained to it, to render the plan certain. It was a vast oblong building of about 340 feet by 190, with an outer colonnade open to the forum, and an inner colonnade, leaving aisles on each side and end. From Vitruvius's chapter on the Basilica it would appear that the aisles were lower than the centre portion, and that the whole was entirely a lintel structure of columns and beams. According to Vitruvius, a basilica should have an apse at one end, which formed the magistrates' court, and was separated from the main apartment ; and the Basilica Ulpia in Trajan's Forum appears in fact to have had an apse at both ends. The Basilica itself was what would now be called an exchange—a meeting place for business men—and Vitruvius directs that it should on that account open towards the sunniest side of the forum, so as not to be too cold in winter. The real historic interest of the Roman Basilica is that, being a building with colonnaded aisles lower than the centre portion, and with an apse at the end, it forms architecturally a prototype of the earliest form of Christian church. The idea formerly entertained that the early Christians actually possessed themselves of some existing basilicas and utilised them as churches is discredited now ; but that the Pagan Basilica influenced the early type of church plan and section there can be no doubt ; the architectural scheme is almost identical, and the churches actually took the title of " Basilica." We shall have to consider the subject more in detail in Chapter IV.

The Roman Thermæ, or great bath establishments, belong to a late period ; the most remarkable and typical being those of Diocletian and of Caracalla. The architectural details would probably have been found much the same as in temple architecture, but the plan (144) was an architectural conception in itself. It included always a great central hall, the Tepidarium, roofed with a cross-vault rising above the rest of the building, so as to allow space under the vault for large windows lighting the hall from above. For the general appearance of these halls, see again Fig. 122. Connected with this on one side would be the cold bath hall (Frigidarium) and on another the hot bath hall (Calidarium), which in Caracalla's thermæ is circular, though this latter seems to have been disconnected by a series of ante-rooms ; and it is probable that what Vitruvius calls the " Laconicum," a word which he does not explain, was a kind of passage-room to the Calidarium, probably with a middle range of temperature between it and the Tepidarium. There were elaborate provisions for heating with hot-air flues the various apartments where artificial heat was required ; the Calidarium walls were almost lined with such flues, the heat being furnished by fires in a low basement chamber called the hypocaust. These, however, are rather engineering than architectural details. The architectural element in the thermæ, apart from the rich and striking treatment of the great hall, lies

in the dignified and severely axial arrangement of the whole plan, the architectural effectiveness of its entrances and columned vestibules and hemicycles, and of the laying out of the ground within the enclosure, with its stadium for athletic exercise and its porticoes for shelter and retirement. No such magnificent provision for luxurious leisure was ever made as in these vast bathing palaces, where the inhabitant of Imperial Rome could spend a morning in bathing and lounging in palatial chambers and along colonnaded walks,

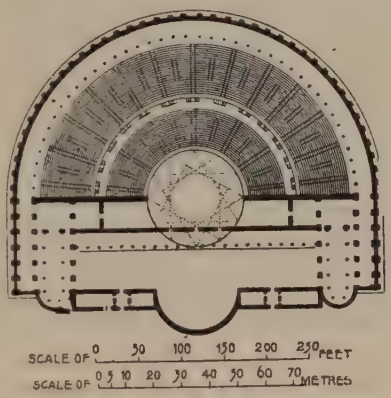


144. Plan of the Thermæ of Diocletian (*circa* A.D. 300).

preparatory to spending the afternoon at the Colosseum to enjoy the spectacle of men being slaughtered by each other or torn to pieces by wild beasts.

The Colosseum is the largest of a class of structures peculiarly Roman ; an amphitheatre with a central space (128) provided for a spectacle addressed only to the eye and not to the ear or the intellect ; a species of entertainment for which there was no Greek precedent. It also illustrates the bold manner in which the Romans faced the problem of providing, whether in amphitheatre or theatre, a great sloping range of seats for a crowd of spectators. Instead of seeking a hollow site suitable for such a purpose, they proceeded, deliberately and regardless of expenditure, to build up an immense mass of wall within which to erect the seats (see 129), the gradient of which was usually terminated internally by a colonnaded gallery running round the top. In the amphitheatre at Verona (125), of which the arena remains nearly perfect,

but only a small portion of the external wall is left, the architectural treatment was in principle the same as at the Colosseum, but in only three stories, and the applied order is less prominent, being more closely connected with the wall design by the system of rustication carried all over it. ("Rustication" signifies a method of emphasising each stone in the masonry by specially grooving or otherwise treating the joints, and sometimes, in addition, by letting the surface of each stone project beyond the general plane of the jointing in a rough, rock-like face.) At Pola the whole exterior wall, treated again on the same principle as the Colosseum, exists complete, but the seating has disappeared; probably, as Fergusson suggests, because it was of wood. The theatre at Orange, with its mass of wall at the back of the auditorium still standing, illustrates the same structural treatment as in the amphitheatres, though there is much less use made here of the applied order, which is only introduced in the lower portion of the wall, the only other architectural feature being a series of flatly treated wall-arches in the upper portion; a detail which suggests a late period of work. The theatre of Marcellus at Rome (145) forms a good illustration of the general characteristics of the Roman theatre plan, in which the auditorium seats form no more than a half-circle, ending in a line parallel with that of the stage, and the built-up proscenium architecture becomes an important feature, often in two stories of orders.



145. Theatre of Marcellus, Rome.

The Colosseum, apart from its architectural treatment, was a masterly piece both of construction and of planning, for the convenient entrance and egress of an immense audience without crowding or confusion. The details of the construction are very fully described, and illustrated by some diagrams, in Middleton's *Remains of Ancient Rome*; he shows how the materials of construction were varied according to the work they had to do: concrete made of hard lava for the foundations; concrete with a lighter "aggregate" of pumice-stone for most of the arching of the corridors, which had little weight on them; tufa for the radiating walls carrying the seats, but with vertical piers of hard travertine run up through them at intervals, as a kind of *nervure* to strengthen and hold together the comparatively soft tufa masonry. A curious feature in Roman building, largely illustrated in the Colosseum, is the habit of building skin-deep relieving arches into brick walls, which are of no structural use. A relieving arch, in the true sense, is an arch built into a wall to take the weight of the superstructure off a lower arch or lintel; but the Romans seem to have inserted these into walls with solid brickwork beneath them, as a mere kind of trick of building, mechanically adopted. It was the knowledge of this habit, no doubt, that led Middleton to assert that the brick

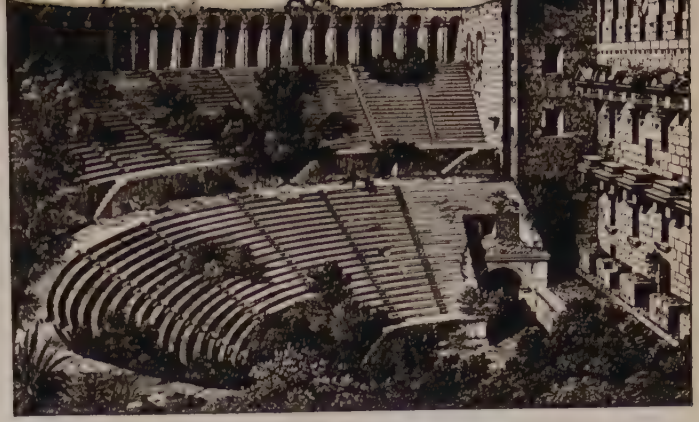
arches in the Pantheon walls were only skin-deep, which turned out for once to be a mistake.

In its great days the interior of the Colosseum must be thought of as a marble-lined edifice, with a great silk awning strained over the whole of the galleries ; the footings for the masts which took the strain of the awning are recognisable both on the inner and outer margin of the auditorium ; the central arena was open to the sky. As to the substructures in which the dens of the animals were placed, various theories have been propounded in regard to what may be called the stage machinery here, but the only rational and practical restoration is that to be found in the splendid series of drawings made by the French engineers in 1812, now in the King's Library in the British Museum, and which seem to be equally unknown to American and English archæologists. Following up some indications of raking lines in the masonry (which Middleton also notices), they show a series of inclined planes in wood, all round the building, leading from the den level to the arena level, by which the animals, as soon as the dens were opened, would run up, as the only outlet. The idea that the Romans would have employed hundreds of men to wind up laboriously, in vertical lifts, animals which had legs to run with, is improbable.

Of other Roman theatres that may be mentioned there are the two at Pompeii (146) ; the one at Aspendos (147), of which the scenarium wall still stands, though bereft of its architectural decorations, and the auditorium shows an arcade instead of a colonnade round the upper portion ; that of Herodes Atticus at Athens (the one on the left hand in the plan of the Acropolis, (103), which is partly excavated in the rock (the Greek method still persisting on Greek soil) ; that at Aizani, where the scena (σχηνή) was decorated with two tiers of columns ; that at Taormina ; and that at Timgad, in Africa (148), in which, as at Taormina, some of the columns of the scena are still standing. In the Roman theatre the stage was raised much higher than in the Greek, there being no necessity for intercommunication between the principal actors on the stage and a chorus in the centre of the auditorium ; and it would appear that in some cases at least the stage was roofed with a lean-to roof sloping upwards from the wall of the scena, the line of which is shown at Aspendos by a moulding. This was probably rather for confining and throwing forward the sound towards the auditorium, than for shelter to the actors.

Another important and typical class of Roman erections was the Triumphal Arch, examples of which are found almost everywhere where Roman conquest penetrated. They may in some cases have been in a true sense " triumphal " erections, emblems of conquest ; but they also served as a kind of monument to, or an outward and visible demonstration in honour of, some individual or organisation, as in the case of the arches of Constantine (140), of Titus, of Septimius Severus, or of the Silversmiths. In some cases they formed the gateway to a street or open place, in others they stood in open ground as monumental erections. Their general form was always much the same ; a lofty centre gateway with a semicircular arch, between massive piers each defined or decorated by two columns on pedestals, either engaged or standing free, with a main cornice over arch and columns, which usually, though not always, was

146 The small Theatre at Pompeii



147 Theatre at Aspendos, Asia Minor (*c.* A.D. 150)

148 Theatre at Timgad (*right*)

149 The Aqueduct at Segovia

150 The Pont du Gard, Nîmes

broken out round the capital of the column. Sometimes, as in the Arch of Constantine, there were smaller side arches between the columns. Above the main cornice, almost invariably, came the kind of subordinate upper stage which, at the Renaissance revival, came to be called the "Attic"—oddly enough, as there is nothing Greek about it; it is a purely Roman device, which in these arches has a very good effect, giving a kind of second accent to the elevation, and serving either for a large panel for an inscription, or for a commemorative bas-relief; or, as in the Arch of Titus, for both purposes, on opposite sides. Generally the attic had projecting pilasters standing over and carrying up the line of the columns, which was the best way to treat it, as giving the columns something to carry; in the Arch of Constantine, where the pilasters are very flat and have statues in front of them, the columns seem to have nothing sufficient to support. Among other fine examples of triumphal arches are those at Beneventum, Orange, Ancona, and Timgad in Africa. The one called the Porta Nigra at Treves, differing entirely from the usual form, and probably a very late example, is of considerable historical interest in an architectural sense, for in its general design, with the apsidal termination of its piers and the series of small decorative columns in the two upper stories, it is much more Gothic than classic in character, and seems like an example of Romanesque architecture come before its time. Among the arches at Rome that of the Silversmiths is also interesting from its special character; it is the only one that has a square lintel-covered opening instead of an arch, and has no projecting columns, only flat pilasters panelled and filled in with carved enrichment. Whether by intention or not, it is remarkable that this arch of the Silversmiths shows so much the character of silversmiths' work—a design that might very well be executed in silver on a small scale. There is a phase of Renaissance architecture in Spain, long after, which has been called "Plateresque" in consequence of its resemblance to silversmiths' work. The silversmiths of Rome seem to have evolved a Plateresque of their own, suggested by the nature of the material in which they worked.

The Roman aqueducts are in one respect among the most interesting and significant of their works, since they serve to show what an architectural effect may be achieved by mere utilitarian structure on a great scale. These great works, which to our modern eyes are among the most picturesque of monuments, were to those who built them simply engineering works, with no more architectural intention than the Forth Bridge. In building these they forgot the columnar orders, and built merely tiers of arches on arches till they obtained the required level for the waterway; the piers in most cases have a large plain impost moulding, from which the springing of the arch is set a little back to allow a support for the wooden centering frame on which they were built. These are almost the only works of the Romans in which there is nothing of academical architecture; no applied features, except in one or two cases where their arches crossed a street in the city, and were treated with columnar features for the occasion. Of those supplying Rome that of the Anio Vetus was the loftiest; but the finest Roman aqueducts are in Spain and France; that at Segovia (149), and that in modern times called the Pon

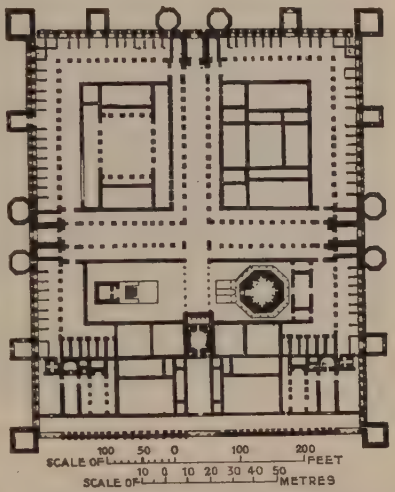
du Gard, at Nîmes (150). This latter almost looks as if it were designed for effect, with its two tiers of great arches surmounted by a smaller arcade, spaced (not very exactly), with four arches to each one of the large arches beneath; but it is probable that this also was done for practical reasons; having got near the approximate height with the larger arcades, it was easier to adjust the exact level required, with a smaller and more manageable arcade.

Of the dwelling-houses of the Romans we know, thanks to Pompeii, a little more than of those of the Greeks; and we have a description by Pliny of a dwelling on a larger scale, which, however, it is difficult to reconstruct with any certainty from his account. The plan of the immense congeries of buildings, repeatedly altered and enlarged, grouped under the name of the Palaces of the Cæsars on the Palatine, has been to a great extent made out, and a restoration of it made by M. Deglane—a wonderful collection of temples, basilicas, halls, porticoes, stadia, &c.; but a great deal of this, even as to plan, must be conjectural, and the restoration of its architectural and decorative treatment still more so. And after all, these, like the vast villa of Hadrian at Tivoli, were exceptional buildings *de luxe*, built by emperors regardless of cost. It is of more interest to study the ordinary dwelling of the average well-to-do citizen, as we find it preserved for us in quite intelligible form at Pompeii (155). It appears to have been usually in one story; the house of Pansa, however, which is generally accepted as the most typical (agreeing most nearly with the description of Vitruvius), appears to have contained stairs, though only in out-of-the-way corners, and obviously not connected with the most important apartments. A restoration of a typical Pompeian house, founded on "The House of the Faun," is given in Fig. 156. A narrow vestibule leads into the atrium, the ceiling of which was open in the centre; small rooms open out of it, and at the upper end, through an inner vestibule called the tablinum (where were placed the household gods), access was gained to the peristyle, with a garden plot and statues in the centre; beyond this, on the central axis (an axial arrangement of the principal rooms was generally maintained), was the more intimate family room. The relative positions of atrium and peristyle vary in other instances, but these appear to have been always the important elements in the interior plan. The decorative treatment of these interiors, the walls panelled and treated with a light quasi-architectural design, with often a dancing figure in the middle of the panel, shows a good deal of Greek feeling, and though executed in a hasty, facile kind of manner, is very graceful. As town houses for a warm climate these must have been among the most charming private residences ever built.

There is, however, one great Roman palace plan, that of the palace of Diocletian at Spalato (151), which is left nearly complete, and is planned with absolute symmetry within a complete parallelogram, with a central avenue on each axis. The symmetrical quadrangular plan was evidently adopted partly with a view to its being surrounded with a fortified wall. It contained a temple, and an octagonal building often described as a temple, but more probably intended by Diocletian as his own mausoleum. The architectural details differ in some respects from those of any other Roman architecture.

and have such a remarkable significance in pointing the way to that free treatment of the elements of the classic order which was destined to develop into Romanesque and Gothic, that they may more suitably be noticed as a *point de départ* in the chapter dealing with that section of our subject.

The Corinthian capital, as worked out in their own way by the Roman artists, is the great glory of Roman architecture in regard to detail, and such an example as that shown in Fig. 142 cannot but compel our admiration for its grand and sumptuous style. Speaking generally, Roman architectural ornament, as already indicated, was far more profuse and exuberant than Greek. Some forms of repeating ornament based on Greek work are to be seen, but they are never treated with the severity and refinement of line of Greek work. There is, however, something imposing in the rich decoration of some of the Roman entablatures of the Corinthian order, such as that given by Taylor and Cresy from the Forum of Nerva; and the style of carved foliage in the frieze shown in Fig. 141, though it lacks the beautiful precision of line of Greek scroll work (compare Fig. 96, for instance), has a breadth and grandeur of its own by which it is impossible not to be impressed.



151. Plan of Diocletian's Palace at Spalato (early 4th century A.D.).

The details of this plan differ in almost every restoration, but this illustration shows the main lines of the arrangement.

Roman columns, or fragments of columns, of probably very late date, have been found in which the surface of the column itself is decorated with carved floral ornament, though there are none such existing *in situ*. It was, in any case, a misapplication of ornament, the shaft of the column being too purely a structural feature to bear any form of decoration which would destroy its severity of line. On a small scale, and where grace and a certain playfulness of effect are aimed at, such a treatment might be employed, as it was in some Renaissance designs; but it is quite unsuitable to monumental architecture.

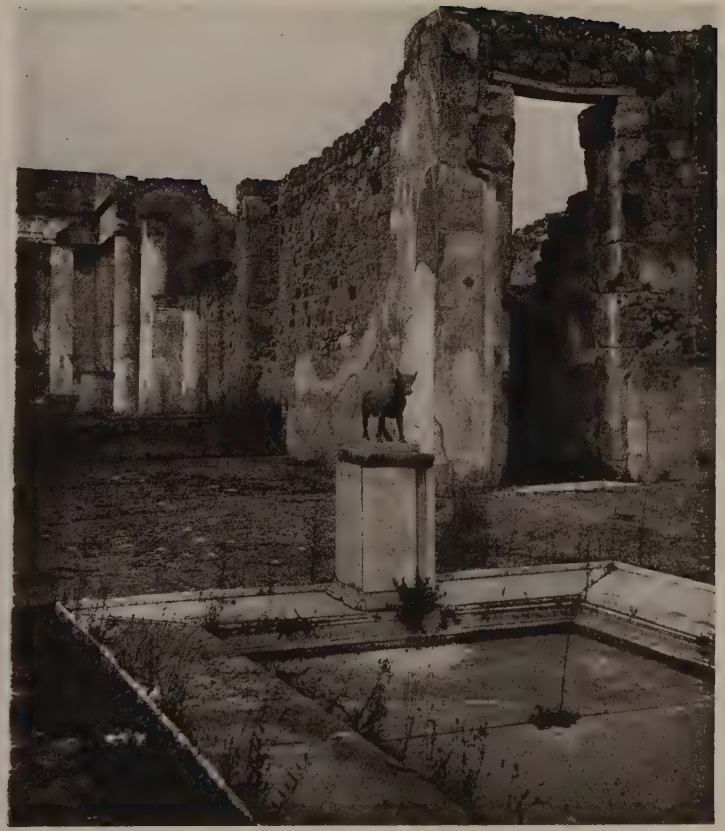
Before quitting the subject of columnar architecture we must take one more glance at Egypt, which had come under the Greek rule of the Ptolemies since 332 B.C., and had been a Roman province since 30 B.C., on the defeat of Mark Antony by Augustus. And yet, strange to say, after these vicissitudes of conquest, we find Egyptian architecture, in its main features and characteristics, much where we left it. In every other country where Roman conquest extended, the Romans carried their own architecture with them; at Baalbec in Syria, at Timgad in Africa, we find the Roman columnar Order, the Roman temple, the Roman triumphal arch, with the same characteristics as on Roman soil. But the persistent and overmastering conservatism of Egypt—we might

add, also, the overpowering grandeur of her ancient architectural monuments —were too much even for the invading and innovating influence of Rome. The late temples of Egypt are not so extended in plan as the vast labyrinths and sphinx-alleys of Karnak and Luxor ; they are of more concentrated and manageable dimensions. Yet here at Edfou, under Ptolemaic rule, we find the old pyramidal pictured pylons again (154) ; the familiar crowning moulding, the bell-shaped capital, the columned halls on a smaller scale ; and at Kalabsche and Esneh, under Roman rule, the same thick cylindrical columns and spreading capitals ; in these capitals at Philæ we find a greater freedom and realism, which does not, however, prevent the whole architectural *ordonnance* being as completely Egyptian as ever. At Denderah, commenced under the Ptolemies and completed under Tiberius, there is a form of capital with human masks, one on each face (153), which did not belong to ancient Egyptian work, and both here and at Edfou there is a new feature in the portico, a screen wall built to halfway up between the columns ; but the whole thing is still completely Egyptian, and but for other chronological information might be supposed (was formerly supposed) to be many centuries older than its actual date. So with the Roman temple at Kalabsche, and the still later and familiar columned structure at the water's edge, as we used to see it, at Philæ (it may now unfortunately be rather said to be *in* the water) ; this is, for Egypt, quite a modern building, and not exactly like any other Egyptian monument we know of ; yet in its capitals and its general appearance it is as unmistakably Egyptian as any of the buildings of the great Theban period. There is no other such example of persistence of architectural style in all history.

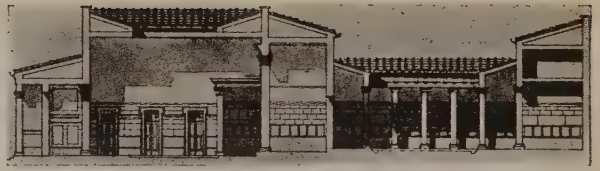
152 Temple of Edfou (*c.* 200 B.C.)

153 Temple at Denderah (late 1st century B.C.) (*left*)

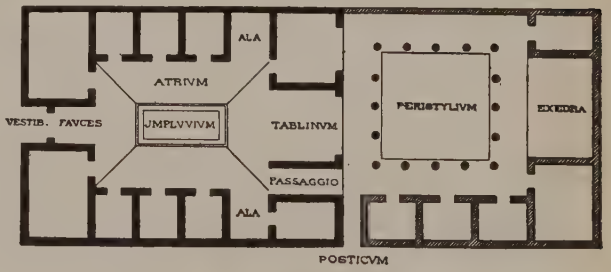
154 Temple of Edfou : West Pylon and Court (*above*)



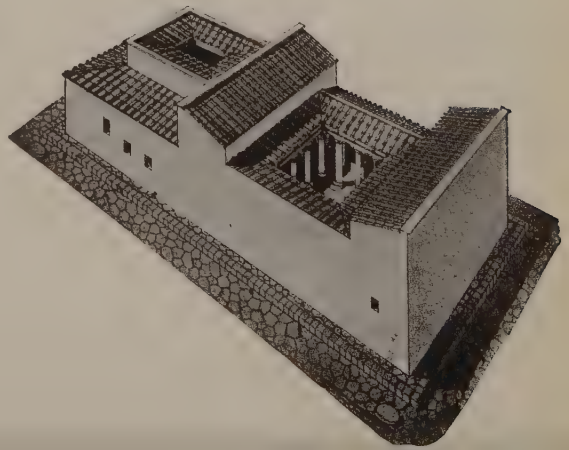
155 Pompeii : The Fountain Court and Pillars and Walls of the " House of the Bull," a typical patrician villa



Section



Plan



Univ. of Arizona Library

B.C.	EVENTS IN GENERAL HISTORY.	GREEK.
1100		
	Dorian invasion of Peloponnesus.	Heraion at Olympia (?).
1000		
	Ionian	
900	Colonies	
	in Asia Minor.	
800		
	Founding of Rome.	
	Sicily colonised by Greeks : Syracuse founded.	
700	Southern Italy colonised by Greeks.	
		Temples at Segesta and Selinonte (?). | First Temple Diana at Ephes
600		Temples at Pæstum (?).
		Temple of Concord, Agrigentum (?
	Pisistratids at Athens.	
	Cambyses conquers Egypt.	
500	Rome becomes a Republic.	
	Battle of Marathon.	
	Raid of Athens by the Persians.	
	Victory of Cimon over Persians.	Ionic temple on the Ilissus.
	Pericles : Athens at height of her power.	Parthenon and Propylæa.
		Erechtheion. Theseion. Temple
400	Etruria subject to Rome.	Tholos at Epidaurus. [Bas
	Sack of Rome by the Gauls.	
		Temple of Diana, Ephesus.
		Mausoleum at Halicarnassus.
	Alexander conquers in Asia Minor, Persia, and Egypt, and invades India.	Temple of Apollo Didymæus, Milet
300	Dynasty of Ptolemies commences in Egypt.	
	First Punic War ; Sicily a Roman province.	
	Gallia Cisalpina a Roman province.	
200	Second Punic War ; Spain a Roman province.	
	Third Punic War ; Africa a Roman province.	
	Greece becomes a Roman province.	
100		
		Temple of Jupiter at Aizani (Phryg
		Tower of the Winds.
	Cæsar's conquest of Gaul.	
	Augustus, first Roman Emperor. Egypt becomes a	
A.D.	province of Rome.	
	Destruction of Jerusalem by Titus.	
100	Trajan.	
	Hadrian.	
200		
300	Diocletian and Maximian joint emperors.	
	Constantine. Founding of Byzantium.	
	Theodosius : division of Roman Empire into east and west.	
400		

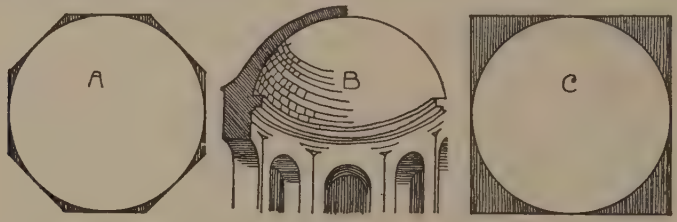
ARCHITECTURAL MONUMENTS.

ROMAN.	EGYPTIAN.
	These were
	disturbed centuries,
	during which few great
	architectural
Cloaca Maxima (Etruscan work). Etruscan tumuli and	monuments
other buildings of which	were erected.
there are only fragmentary remains.	
	Great temple at Philæ commenced.
	Temple at Philæ completed.
	Temple at Edfou.
Temple of Jupiter Olympius, Athens.	Portico at Philæ.
Doric Temple at Cora (?).	
Circular temples at Rome and Tivoli.	
Temple of Mars Ultor.	Temple at Kalabsche commenced. Temple at Esneh. Temple at Denderah.
Temple of Fortuna Virilis. Theatre of Marcellus.	
Colosseum. Arch of Titus. Trajan's Column.	Temple at Kalabsche finished.
Roman walls in Britain. Pantheon. Maison Carrée, Nîmes (?). Temples at Baalbek. Theatre at Aspendos. Arch of Septimius Severus.	
Thermæ of Caracalla. Thermæ of Diana, Nîmes. Thermæ of Diocletian.	
Diocletian's palace at Spalato. Arch of Constantine. Basilica of Maxentius.	

CHAPTER III

DOMED STYLES AND THE BYZANTINE TYPE

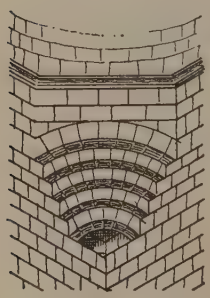
THERE were, as we have seen, domed buildings erected by the Romans ; one of them the Pantheon, one of the grandest and most important domes ever built. Yet we cannot rightly speak of Roman architecture under the heading of the domed styles of the world, for two reasons : first, that with the Romans the dome was only an exceptional expedient, introduced as a roofing to a building planned for special reasons in a circular form ; none of their temples, halls, or other rectangular buildings were ever roofed with domes : secondly, that the erection of a dome over a circular plan is a comparatively simple problem of construction, or at least so it appears to us in a scientific age ; it is in fact an almost self-evident manner of closing in a circular building. The



157.

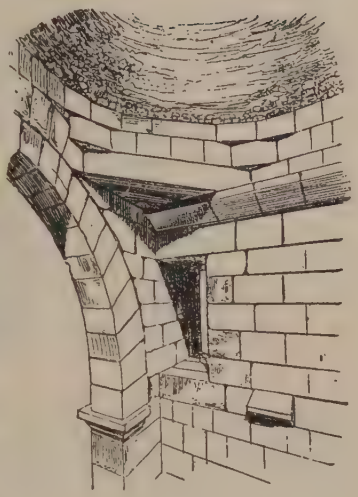
real problem of domed construction was solved only when men had learned to build circular domes over square compartments, so as to render the whole a stable and logically designed construction.

If we draw the plan of the circular dome above a square of the same diameter (C, 157), we see that there is an approximately triangular space left between them at each angle of the square. How is this space to be bridged over so as to obtain a firm circular base on which to erect the dome ? There are three ways in which it has been tried. One is to build a series of diagonal arches across from wall to wall, each projecting beyond the one below it (158), till at the level at which the dome is to start the base line for it becomes an octagon, on which a dome on a circular plan can be built without difficulty. As is shown at A and B, Fig. 157, the adjustment required in the transition from an octagon base to a circular superstructure is very slight, and is easily managed. In some of the earliest attempts at dome building, the transition was made in a more crude manner by simply placing a flat slab across the

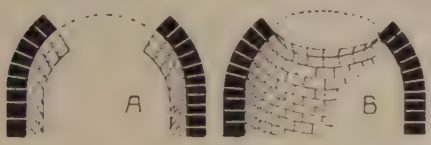


158.

angle (159). But it is obvious that both these are makeshift systems, and that there is no true relation of line between the dome and its substructure. As a matter of design it might be met by making the dome octagonal on plan; but though an octagonal dome passes under the name of a dome, and may be accepted as such as a matter of effect, as in the well-known example of the cathedral at Florence, such an erection is not a dome in the true structural sense. For it is the essential structural quality of a dome that it is an arched construction not only in the vertical but in the horizontal sense; each ring of the masonry, once filled in, is a complete horizontal arch, and cannot fall in if it has an adequate seating on the ring next below it. An incomplete arch, as at A, Fig. 160 cannot stand; but with a dome there is no necessity, as with an arch, to complete its curve and fill it in with a keystone at the apex; it can be stopped at any point and left with an opening in the centre, as at B, which would not be the case with an octagonal dome with eight straight-lined faces.

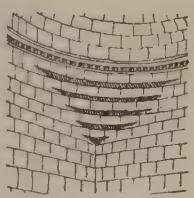


159.



160.

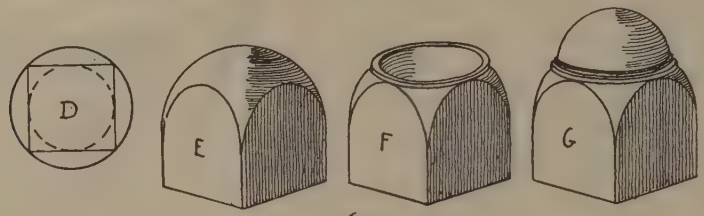
A second method (161), is to corbel out from the angles of the walls with courses of stone, each projecting beyond and carried by the one below, and following on plan a curve concentric with that of the plan of the intended dome, until a complete circle is formed by the topmost course, on which the dome is started. This is more logical in appearance than the system of diagonal arches ("squinch arches" they are called), but it is not so strong a construction or so easily built, and it could hardly be carried out with safety except on a rather small scale.



161.

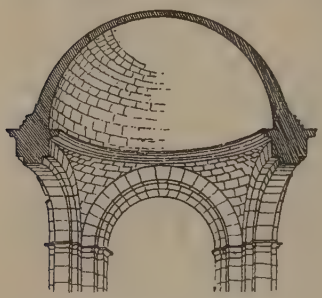
The true and complete method of domical building over a square plan is to treat the triangular spaces between the walls and the base of the dome as if they were parts of a lower dome, the section of which would be that of an arch carried across the *diagonal* of the square space to be covered, and with a horizontal curve concentric with the plan of the intended dome. As the diameter of the arch is that of the diagonal of the square, it forms part of a dome too large for the space, represented by the outer circle in the plan D (162), part of it is therefore cut off by the planes of the four walls, so as to form

wall-arches against them, as at E. When the four sections of this lower dome have been carried high enough to meet the apex of the wall-arches, and to form a complete circle within the limits of the four walls, as at F, that circle forms at once the base of the real dome, which is built upon it, as at G, and becomes, so to speak, the keystone of the four triangular sections of dome



162.

beneath. The weight of the dome is transmitted through the four triangular pieces of doming to the meeting angles of the walls, which therefore require very strong abutments at this point to resist the thrust of the whole domical erection. That done, the whole is a stable construction, on a complete and consistent domical principle. The triangular subsections of domed surface are termed (rather unsuitably, I think) " pendentives," because to the eye they may be said to appear to hang from the base of the main dome, though, in fact, they are built up to support it. The appearance, as seen from the interior, is shown in Fig. 163.

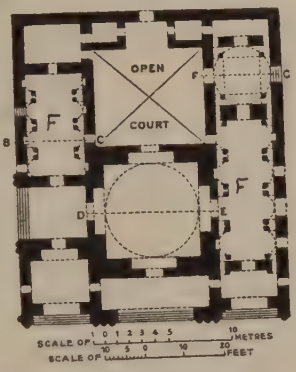


163. Dome on Pendentives.

The great exemplar of this consistent method of domical construction is the church, for many centuries past unhappily a mosque, built at Byzantium in the sixth century by order of the Emperor Justinian, and dedicated to Hagia Sophia or Holy Wisdom. We may say " unhappily a mosque " on purely architectural grounds, apart from any theological prejudice, since its Mohammedan possessors have done much to debase the interior by hanging up Brobdingnagian texts from the Koran, completely out of keeping with the scale and character of the architecture, as well as defacing it in other ways ; and the decorative effect of the interior is now but a shadow of what we can conceive it to have been, from contemporary descriptions, in the days when it was a Christian church. But the great architectural scheme still remains to render it one of the most wonderful interiors in the world. What the Parthenon is to columnar architecture, Hagia Sophia is to domed architecture. We have now to consider, as far as there is evidence, what were the antecedents of such a building, and what was the subsequent history of the styles of which it is the greatest and unequalled monument.

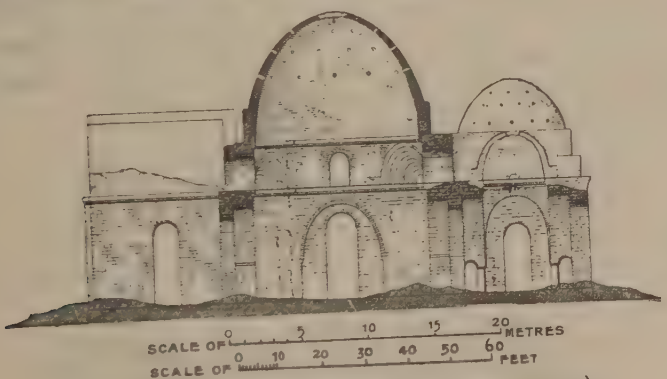
For the first important essays at the erection of a dome on a square plan we have to return for a time to Persia. We left Persia with a columned and

timber-roofed style under the Archæmenidæ. The successive subjection of Persia to the rule first of the Seleucidæ (312–236 B.C.), after the death of Alexander, and next of the Parthians (236 B.C.–A.D. 226) does not appear to have been the occasion of any important architectural development. The remains of the palace at Hatra show that the Parthians could build barrel vaults on a considerable scale ; and the plan of the vaulted rooms, and the provision for abutment to the vault, had some influence on the work of their successors ; but both structure and details were exceedingly naïve, and there was no attempt at domed roofing. It was only with the accession of the Sassanian dynasty, A.D. 226, that there arose on Persian soil an architecture of some historical importance both in plan and structure.



164. Plan of Palace, Serbistan.

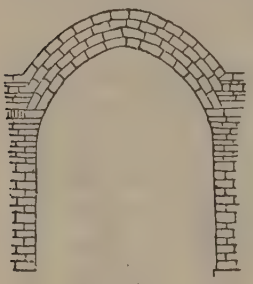
The building, sometimes called the palace of Tigranes, now a mosque, at Diarbekr, is the earliest building connected with the Sassanian dynasty of which there are any important remains ; but its two façades, facing each other at opposite ends of a great courtyard, have none of the special character of Sassanian architecture, and look more like debased repetitions of Roman building, with two orders of widely spaced columns one above the other ; and it seems rather problematical whether they were really erected by the Sassanians,



165. Section of Palace, Serbistan (4th century A.D.).

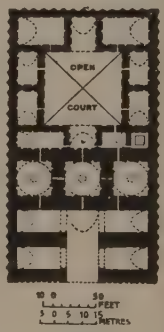
or only taken possession of by them. The real characteristics of Sassanian architecture are first brought before us in the remains of the palace of Serbistan (164 and 165), which shows the earliest surviving example of a genuine dome erected over a square compartment. The builders had not, however, hit on the method of the true pendentive as described above ; the transition from the square to the circle is made by a rather clumsily constructed arch built across the angle, and forming a kind of funnel-shaped vault.

Both domes—for there are two in the building, a larger and a smaller one, not placed in any symmetrical or axial fashion—have an approximately elliptical section, the lower portion not falling over very much ; and there can hardly be a doubt that this form was the result of the endeavour to construct domes either with no timber centering or with as little as possible ; up to where the dome begins to close over it could easily be built in horizontal courses without centering ; possibly a light centering for the upper portion may have been supported on the lower part of the wall of the dome. The side galleries show an arrangement of which there is no other known example before or since ; short coupled columns about six feet high, standing a little way from the main walls, and with neither base nor capital save a plain long abacus stretching over both, carry a series of ponderous piers and wall-arches with wide shallow apses between them, and from the face-line of these piers springs the barrel vault, ovoid in section like the domes (see F on plan, and right side of section). By means of this clumsy though picturesque arrangement the width to be vaulted is much reduced. Fig. 175 is a photograph of this singular piece of architecture.

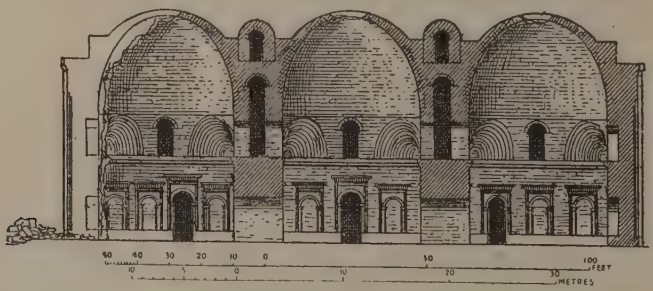


166.

Serbistan is credited to about the middle of the fourth century ; the palace at Firouzabad, presumed to be about a century later, has three domes placed in line across the plan (167 and 168) of similar internal section and structure to those of Serbistan, but little of the domes is shown outwardly ; the walls between rise to the haunches of the domes, the mass of masonry between being lightened by the introduction of two narrow arched galleries, a lofty one below and a smaller one above. The exterior walls of the palace are treated with strips of rude half columns the full height of the wall, with high narrow wall-arches between them (169). The doorways are arched ; but above them, singularly enough, they have a kind of cornice exactly imitating

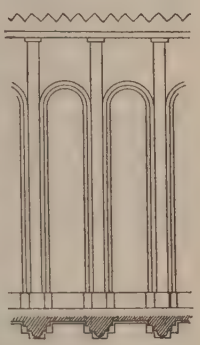


167.
Plan of Palace, Firouzabad.



168. Section through the Three Domes, Firouzabad (5th century).

the Egyptian-like cornice moulding of the early Persian architecture; a survival of an earlier detail in a building which has nothing else in common with the architecture of the Achæmenidæ. A later important relic of Sassanian architecture is the half-ruined façade of the palace of Chosroes I at Ctesiphon, probably about the middle of the sixth century, with a great arched vault in the centre, of the characteristic ovoid form (170). The walls here, on each side of the great central arch, are most elaborately treated, with wall columns, coupled on the ground story, single in the next story, but the upper ones not superposed in any symmetrical way over the lower ones: it is like a crude imitation of the superposed wall-orders of the Colosseum by builders who did not understand its meaning. Between these columns the wall is covered with arcading in a manner which forcibly reminds one of the similar treatment of walls which was afterwards to become so common in the Romanesque and Gothic structures of the West. There is not a more curiously significant piece of wall in the world; it seems like the last echo of Roman classicism mingled with the first prophecy of Gothic profusion.



169.

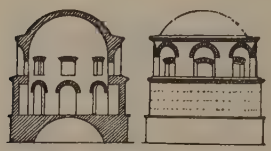
Beyond this application of columns and wall-arcading, there is little ornament to be found in Sassanian architecture. The remains of two later palaces, at Mashita and Amman, in the land of Moab, probably of early seventh century date, show a quantity of beautiful surface carving, but these are exceptional buildings probably decorated by Syrio-Greek artists; it has been observed that the carving frequently introduces the vine and grapes, whence it is concluded that the artists were familiar with or had been occupied over Jewish work. The decorative treatment of the lower part of the walling at Mashita (209) is most beautiful work of very unusual design, and it is historically interesting in the sense that there seems to be in it some kind of suggestion of the character of the Saracenic school of detail which was to arise not long after.

In its typical monuments, however, Sassanian architecture presents the aspect of roughly built and monumental structure, chiefly interesting for its

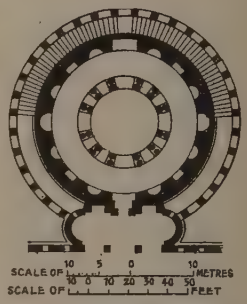
170. Palace of Chosroes, Ctesiphon (6th century).

innovations in dome construction. It is in strong contrast to the ancient Persian style of the Achæmenidæ. The latter was a style characterised by rich and beautifully executed surface decoration and poor and mixed construction ; the Sassanian was a builder rather than a decorator, and it is as building that his work is of value as a link in architectural history.

In Texier and Pullan's work on Byzantine architecture it is remarked that " the science of construction acquired by the Romans descended to the Byzantines." If this is intended as an assumption that the typical Byzantine form of architecture was derived from Rome—that Hagia Sophia at Constantinople is the architectural descendant of the Pantheon, we must hold it to be a false conclusion. Neither in regard to construction nor detail is there any alliance between the two. The constructional problem in Hagia Sophia is totally different from that of the Pantheon, and is solved in a totally different manner. The Roman system is the erection of a dome over a circular plan ; the Byzantine is the erection of a dome over a square plan. It is in this light that the remains of Sassanian architecture acquire their historic significance. It is to Asia Minor and the East, not to the West, that we must look for the suggestions which culminated in Byzantine art.

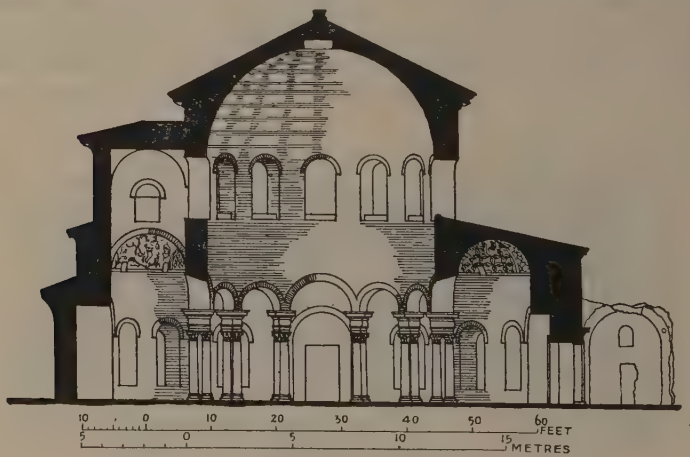


171. Tomb of Sta. Helena, Rome (early 4th century).



172. Plan of Tomb of Sta. Costanza, Rome (late 4th century).

There are various domed churches and other buildings of the early Christian era to be noted at Rome and elsewhere, previous to the development of the Byzantine type of plan and section. There is the octagonal domed church



173. Section of Tomb of Sta. Costanza, Rome.

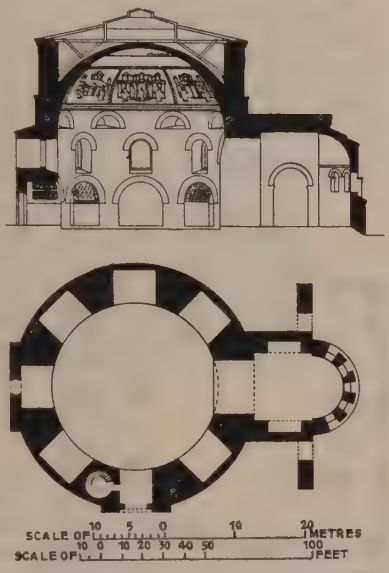
174 Interior of Domed Building, Spalato
(early 4th century)

175 Column and Vault at Serbistan (*left*)

176 The Rotunda of St George, Salonica

177 Church of the Monastery of Daphni

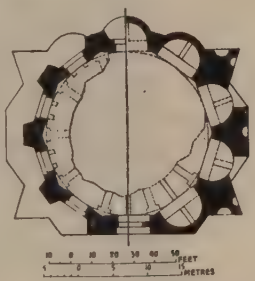
or mausoleum in Diocletian's palace at Spalato (174); a building, however, completely classic and Pagan in style, with its internal surrounding colonnade of Corinthian columns. There is the circular tomb at Rome called that of Sta Helena and at any rate probably belonging to the age immediately preceding Constantine (171); a two-storied rotunda on a square podium, with arched openings and a dome which showed a semicircular section internally, but only showed a segment externally, the outer wall being carried well up above the springing, as at the Pantheon; it somewhat suggests the Pantheon in miniature, without its portico. Then there is the tomb of Santa Costanza at Rome, a circular building with an inner arcade on coupled columns carrying a dome (172 and 173). There is, again, the very interesting and simply designed circular church or Baptistery at Nocera dei Pagani, also with a circular colonnade of coupled columns, carrying a dome of elliptical section covered externally with a wooden roof. And at Thessalonica or Salonica we find the church of St George (176), probably early fifth century, a circular church with an internal hemispherical dome springing from the outer walls, and, like that at Nocera, covered with a wooden roof. This is interesting from the fact that all columnar architecture has disappeared from it; it is an architecture of arched openings only.



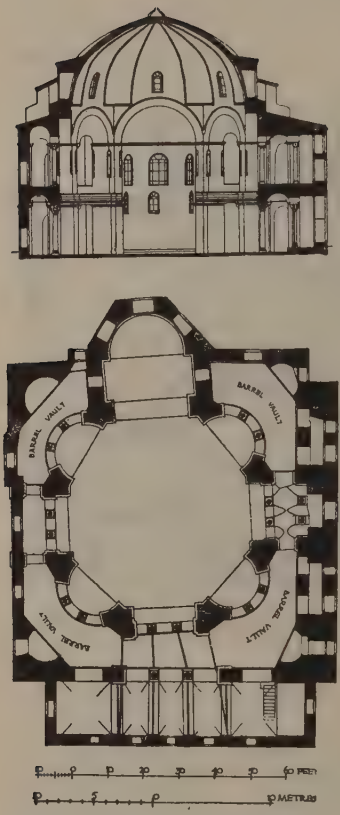
178. St George, Thessalonica (early 5th century).

179. Plan of Tomb of Galla Placidia, Ravenna.

But all these are domed churches on a circular plan. The tomb of Galla Placidia at Ravenna (A.D. 450) looks at first sight like a kind of rude attempt at a pendentive dome (193); but in reality it is the opposition of four barrel-vaults on four sides of a square (see plan), with the roof space between them "fudged" into a kind of approximate domical form. The one Roman domed building which may seem to have some relation to Byzantine methods is that formerly called the Temple of Minerva Medica, but now believed to have been part of a Thermæ building. In this the plan is decagonal (180), and the structure is said to show the earliest true pendentives known; but as the transition was

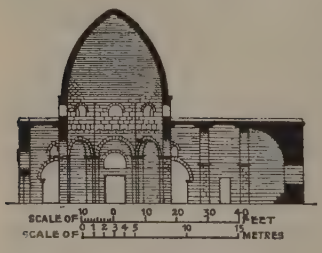


180. Plan of Minerva Medica, Rome (5th century ?).

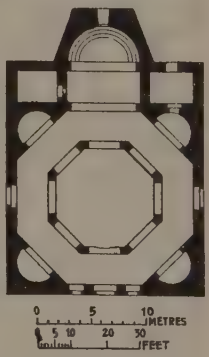


181. Section and Plan of S. Sergius, Constantinople (535).

only from a decagon to a circle, these are small and unimportant, and it is doubtful if they formed any part of the visible interior design. But the plan of S. Sergius at Constantinople (181), which probably preceded by but a few years the commencement of Hagia Sophia, certainly has a good deal of resemblance to this; while the rather flat section of the dome of S. Sergius, a segment of a circle, has considerable resemblance to that of Hagia Sophia, though on a much smaller scale. There is still, however, as with the Roman dome builders, the timid shrinking from the attempt to erect a dome unless its base was supported from the floor; and even with an octagonal instead of a circular substructure this is practically the case. There is again the example of the church at Ezra in Syria (182 and 183), stated by Fergusson to be undoubtedly of the date 510; a church with a high circular dome of very nearly pointed section; but this dome is supported on an octagonal arcade in the centre of the floor, leaving only the slight difference between octagon and circle to be got over at the angles. It was Anthemius of Tralles who, when called upon by Justinian to build the great church of Hagia Sophia, boldly stepped beyond the immediate precedents in construction, and by the system of true pendentives erected an immense dome above a great square area, hanging it, as it were, in the air without a particle of vertical support from the floor. It may have been that he was a great original genius in construction, and that for once a new departure in architecture can be traced to an individual influence; but if he was indebted to any precedent it must have been in the Sassanian buildings that he found it, and not in the teaching of Rome.



182. Section of Church at Ezra, Syria (510).



183. Plan of Church at Ezra.

184 Santa Sophia

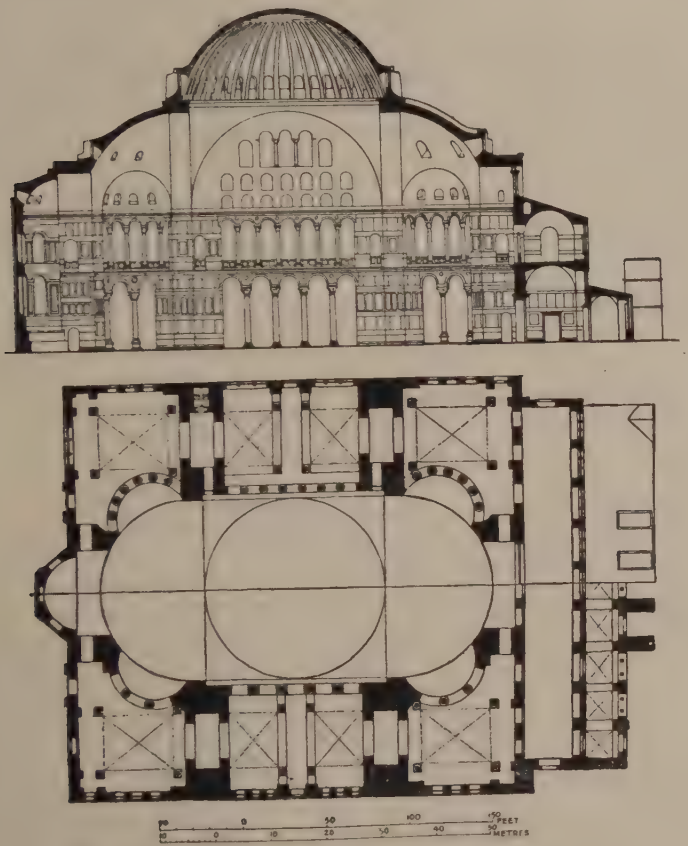
185 St Antonio, Padua (13th century)

186 Capital in Church at Parenzo
(6th century)

187 Exterior view of Hagia Sophia (537–563)

188 Sanctuary and South-East Exedra, Hagia Sophia, from the North Aisle

The plan of Hagia Sophia (189) shows in its most complete form that which is more or less the typical Byzantine *motif* in planning; the central space with a dome over it, representing the Eastern ideal of the church plan, as the long parallelogram of the vaulted nave represents the Western type. The central space is in few instances so large a portion of the whole area as



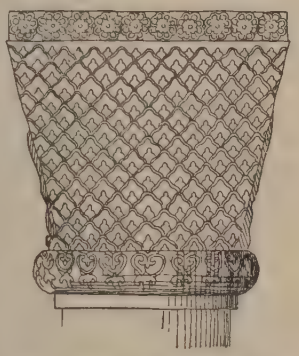
189. Section and Plan of Hagia Sophia, Constantinople.

it is in Hagia Sophia; in a good many instances the central dome is comparatively smaller, and may be attended by other subsidiary domes symmetrically grouped; but the Byzantine type of plan is that of a central space, as the Western one is that of an avenue. The section of Hagia Sophia (189) shows how completely the domical construction pervades the building; the two end compartments, behind and beneath the great eastern and western arches carrying the central dome, being also semi-domes, so that the roof seen from within is a collection of domed surfaces; as Procopius significantly observes, "the sight causes the spectator constantly to change his point of view."

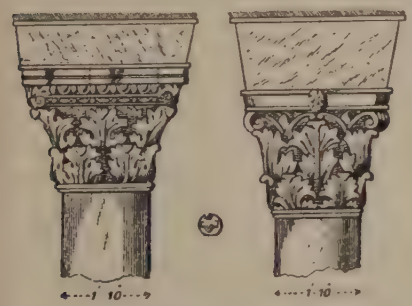
Startling as it seems to us with our Western methods of building, it is probable that the dome, though of so comparatively flat a section, was erected without centering, except that a light scaffolding would be supported on one of the higher rings for closing in the crown of the dome; though we do not know, of course, how many men were killed over the job. The dome was first built of a considerably flatter section than at present—a much more bold and risky constructive problem—and fell in before it was completed; this is attributed by historians to an earthquake, but it is quite possible that the very flat arch section employed was deficient in conditions of stability. On the whole the effect of the present dome is probably finer than that of the first design would have been—it is more in proportion to the general height of the church; though as a general principle it does not follow that the internal effect of a dome is in proportion to its height, the diminishing effect of perspective having to be taken into account. Such a construction as this, of course, required ample abutment to resist the thrust of the four great arches and the dome resting on them and on the pendentives, and the plan provides liberally for this by the immense masses of pier on the north and south sides, taking the thrust of the eastern and western arches, which are entirely open; on the north and south sides the arcading under the great arches would take part of the weight; but nevertheless, seeing that the pendentives discharge equally at all the angles, the arrangement of the piers with so much greater abutment in the transverse than in the longitudinal direction is not very scientific nor architecturally logical. Externally, the truthful expression of the structure, revealed as a mass of bold buttressing, is in itself a delight no doubt in direct proportion to the necessitous character of its form, but it must be admitted that the interior is more deliberately glorious.

This internal glory, in the first state of the church, must have been rich and splendid in the extreme. The mass of the walling was brickwork, with very thick mortar joints, these thick joints being usually characteristic of Byzantine work; in this, in the interior, and after the brickwork had settled down, was added a veneering of varied and beautifully coloured marbles. Some idea of the general effect as at present existing is given in Fig. 187, from a drawing by Mr A. E. Henderson. Only the base of the central dome is seen here, with its row of windows in the right-hand corner of the view. The decoration of the dome and pendentives with mosaics, showing figures and emblems in colour on a gold ground, formed the culmination of the decorative scheme; and mosaic, a form of decoration especially suited for application to concave surfaces, has formed a feature in Byzantine interiors wherever it could be afforded. That the exterior, or part of it, was originally faced with marble (perhaps in this case white) is probable, though none of this is left now. The columns are monoliths of coloured marble. The treatment of the capitals, and of the carved detail generally, is as remarkable as the plan and structure of the building, and is conclusive against the idea of the Roman origin of the style. The Byzantine column and capital are descended, in a sense, from the Roman Corinthian column; they owed their suggestion originally, no doubt, to Roman buildings in Asia Minor and

Syria ; but nothing could be less Roman in style and feeling than the Byzantine forms of capital. The capital has been changed from a concave to either a convex or a straight-lined form (204, 205), much more suited to carry an arcade ; reminiscences of the Ionic volute are interspersed with a leafage which retains a recollection of the classic acanthus leafage, but is treated in a quite different spirit (206) ; the carving is crisper, the leafage more pointed, the effect of points of shadow is obtained by the use of the drill. The work has more of Greek than Roman element in it ; it is the classic leafage transformed by the hands of Syrio-Greek artists ; it is distinctly Asiatic rather than Western in origin. That the artists should have been actually acquainted with such Sassanian work as that of the capitals at Bi-Sutoun is hardly probable ; but this Sassanian detail, so curiously suggestive of later Byzantine character, is an evidence as to the part of the world in which the feeling and style of the latter has its origin. One occasional form of leafage capital, and one totally at variance with the classic spirit, is the " wind-blown " capital, in which the leafage is carved as if blown by the wind in one direction. There is an example in St Sophia at Thessalonica, of the time of Justinian, and one of about the same date at S. Apollinare in Classe, Ravenna ; but the device has been made famous by the similar capitals in the portal of St Mark's, Venice, (204) which Mr Spiers, however, thinks were imported from the East, and not carved at Venice.



190. Capital from Bi-Sutoun (5th century ?).

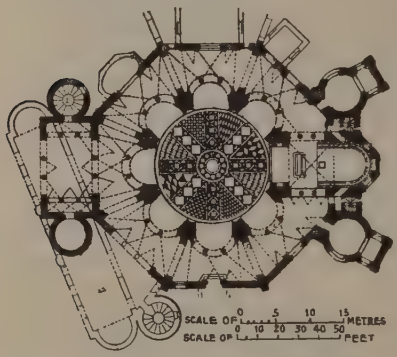


191. Capitals, Dome of the Rock, Jerusalem (7th century).

Another peculiar point to be noted in the Byzantine capital is the block with sloping sides, called the *dosseret*, which is almost invariably found between the capital proper and the springing of the arch. It has been thought by some that this was a kind of shorthand, if one may so express it, for the Roman block of entablature inserted between the capital and the springing of the arch ; but had it been imitated from that, its proportions would surely have been very different from this comparatively shallow block. A more probable origin would be from the habit, in early Christian churches, of using columns taken from classic buildings, which would not range exactly in their new position, and were packed up by the dossercts to a level springing line. This use of the dosseret is conclusively shown in these two capitals from the " Dome of the Rock " at Jerusalem (191), probably built by Byzantine

masons, where both columns and capitals are of unequal height, and the imposts are levelled up by the dosserets. St Demetrius at Thessalonica, probably early sixth century, a Basilica church with some Byzantine characteristics, shows dosserets planted on the top of capitals some of which retain the classic form. In Hagia Sophia the dosseret is more completely accommodated to the capital, and looks less like an interpolation, and here, of course, the columns would have been worked for their position and not borrowed from any other building; but that may nevertheless be the origin of the feature.

Nothing else in any way equal to Hagia Sophia was ever done on Byzantine lines of building, but it forms a great centre from which radiated an architectural influence permeating far and wide both in respect of locality and time. It is to Ravenna, that "fortress of falling empire," that we first turn, and notice in the first place two pre-Byzantine buildings (architecturally); the "orthodox" Baptistery, an octagonal building of which Fergusson observes, "its design is somewhat like that of the temple" (or mausoleum) "at Spalato, but with arcades substituted everywhere for horizontal architraves; the century that elapsed between these two epochs having sufficed to complete the transition between the two styles." Its interior was more or less Byzantinised in the fifth century by mosaic decoration. The other is the tomb of Theodoric the Goth (194), a decagonal structure resembling nothing else in the world, capped with a monolith domed cover some 35 feet in diameter, with handles all round worked out of the solid stone, by which to raise it to its position (it does not seem to have occurred to the architect to remove these afterwards). The building has a certain significance in connection with Byzantine Ravenna, as showing a local disposition towards the employment of circular or polygonal plans. The important Byzantine monument of Ravenna, however, the church of San Vitale, might have assumed its octagonal form independent of any local influence, for it was built after the annexation of Ravenna as an exarchate by Justinian; the plan (192) shows a general resemblance to S. Sergius with some features—the arcaded recesses especially—borrowed from Hagia Sophia; and it was unquestionably built to Justinian's order and by artists from Byzantium. The dome, however, after the Western manner, is covered with a timber roof externally. The carved capitals are in much the same style as those of Hagia Sophia, but the dosserets are not so artistically united to the main capital, and have a somewhat clumsy and primitive appearance in comparison with those of the great Byzantine church, as will be seen in the view of the interior (196).



192. Plan of San Vitale, Ravenna.

193 Tomb of Gallia Placidia, Ravenna (*c.* 440

194 Tomb of Theodoric, Ravenna (530) (*left*)

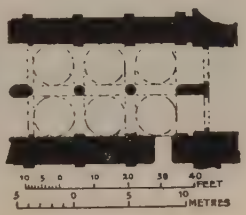
195 Chapel of St Paul, the Cathedral, Monreale

196 Interior of San Vitale, Ravenna (541–550)

The building called the Golden Gateway, at Jerusalem (197), which is also attributed to Justinian, is of some interest in connection with the subject, as it is a rather curious mingling of Byzantine structural design with the remains of Classic tradition. It contains two aisles of three bays each vaulted with cupolas on pendentives, carried in the centre by arches springing from columns which show a Byzantine type of quasi-Ionic capitals with dosserets over them ; but the walls show flat pilasters of very classic appearance, and a frieze and cornice running along the wall and breaking round the line of the pilaster in the (then) old-fashioned Roman way ; and, stranger still, the same form of cornice and frieze which in the interior keeps the classic horizontal line, on the exterior is found bent into segmental arch forms, apparently once forming a curved cornice over openings that have been built up at a later period. This use of the Classic entablature, or something very like it, in an arched form, is an incident of the

Sketch of Interior.

Bent Entablature on the Exterior.



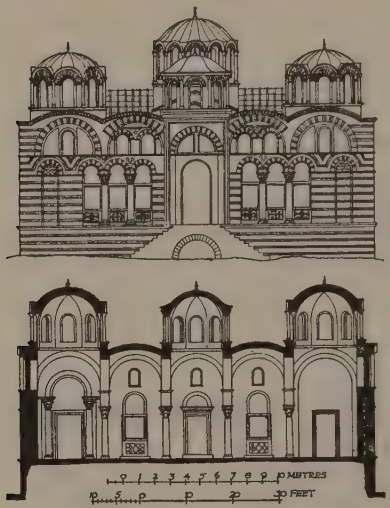
Plan.

197. The Golden Gateway, Jerusalem (6th century).

greatest significance in regard to the evolution of arched architecture out of the materials of Classic architecture, which was the business of the Romanesque period ; and we shall have to recur to it again in the next chapter, in connection with a similar architectural incident from Spalato.

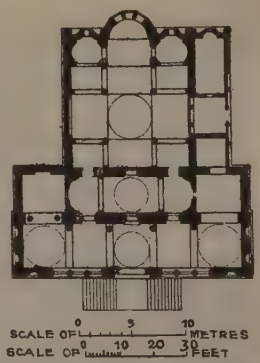
The columns and arcade of the Dome of the Rock (otherwise called the Mosque of Omar) at Jerusalem, already referred to, also show a marked Byzantine character (191), and their erection has even been ascribed to Justinian, but it seems more probable that this part of the structure was erected under Arab rule, but by Byzantine workmen, employing the *disjecta membra* of previous late Classic buildings to furnish the columns and capitals, and piecing the whole together with the aid of dosserets. The fact that the arches are round indicates the hand of the Byzantine builder ; Arab builders would have pointed them. The whole argument and evidence on the subject is very carefully gone into in the late Professor Hayter Lewis's book on *The Holy Places of Jerusalem* ; and his conclusion, that the building was erected to the order of the caliph, Abd-el-Melik, at the end of the seventh century, seems most in accordance with the internal evidence and with the fact that the building is actually dated the year 72 of the Hegira, or A.D. 694 (the " 691 " in Lewis's book is obviously a misprint).

The greatest number of examples of Byzantine churches subsequent to the date of Hagia Sophia and San Vitale are found in Greece and Armenia, some few in Constantinople, and a good many, mostly ruined, in various parts of Asia Minor. None of them are on a large scale, and most of them are of a considerably later date than the time of Justinian; either there was an intervening period of slackness in building, or, in the case of Constantinople, we may assume that churches once standing have been destroyed. And the method of treating the dome at Hagia Sophia and San Vitale, as a segmental or semicircular covering pierced with windows in the lower portion of its surface, has in nearly all the later examples been abandoned for a different treatment, which makes the dome rather a kind of lantern with a high drum pierced at the sides with windows, the arches of which in many cases, or the mouldings over them, rise up and cut into the base of the domical covering. The object of this change in the treatment of the dome—a treatment only suitable or practicable on a rather small scale—was no doubt to produce an external effect of sky-line.



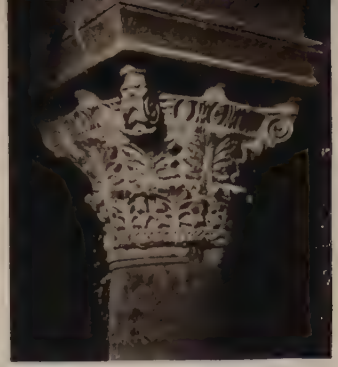
198. Elevation and Section of Church of the Theotokos, Constantinople (10th to 12th century).

Hagia Sophia, as already observed, is in design essentially an interior architecture; and though a low dome of monumental scale and structure may be made to produce a fine effect externally, if the substructure is designed in such a manner as to harmonise with its lines, it is difficult to make such a design effective on a small scale. The church of Sta Irene at Constantinople, of the eighth century, in which the dome is raised on a circular drum with arched windows and buttresses, is probably one of the earliest examples of this modified treatment of the dome; a later example, showing more completely the character of what may be called the Neo-Byzantine style, is the church of the Theotokos at Constantinople (198), of which the date is uncertain, but probably not earlier than the tenth century. This church has five domes or cupolas designed in the manner described above, three of which are over compartments of the narthex or vestibule; the one over the centre of the church is rather larger than the others. This arrangement of plan (199), of several domes with a central one somewhat dominating the



199. Plan of Church of the Theotokos.

200 Pierced Panel in St. Mark, Venice

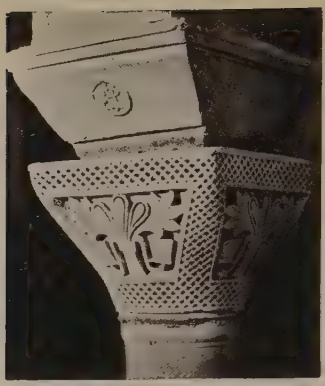


201 Capitals from the Cathedral, Torcello (9th century ?)

202 Interior of St. Mark, Venice (11th century)

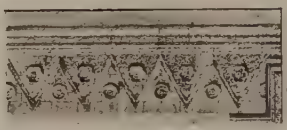
203 The Cathedral and Sta. Fosca, Torcello

204 Capital, St. Mark, Venice (11th century)



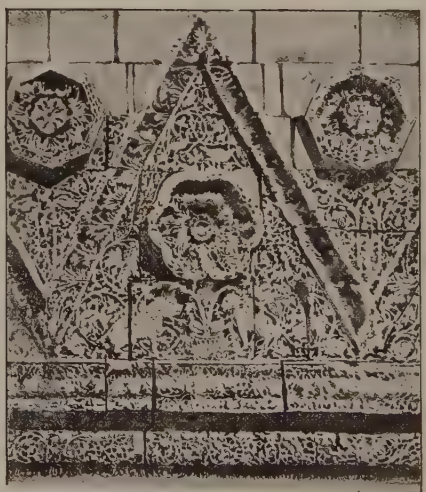
205 Capital with Dosseret, S. Vitale, Ravenna (*c.* 545)

206 St Demetrius, Thessalonica (600)



207 Wall Ornament at Mashita (7th century)

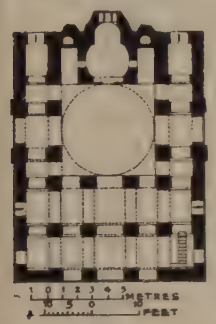
208 Wind-blown Capital, St Mark, Venice (11th century)



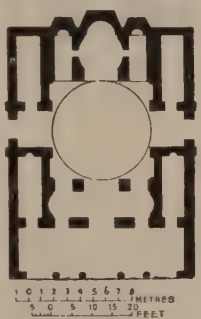
209 Wall Ornament at Mashita (7th century)

rest, is also a characteristic of many of the later churches in Byzantine style, and of course is a radically different scheme from the wide central space and single dome of S. Sergius, Hagia Sophia, and San Vitale; though the central ideal of plan is usually kept up so far as to make the central dome more or less dominate the others.

Among the Byzantine churches of Athens, St Nicodemus, probably the oldest, retains the idea of the rather wide central space with a single dome (210), which externally appears as a circular drum pierced with windows and covered with a segmental domical roof in which, however, the eaves form a horizontal line and are not interfered with, as in later types, by the arches or arched mouldings above the windows. At the monastery of Daphni, a few miles from Athens, is a church (177) peculiar in plan (211) and with the single large dome or cupola, which externally shows a series of half-round columns round which the line of the eaves is carried. Messrs Schultz and Barnsley have published a monograph on two interesting churches at Stiris, probably of the eleventh century, one of which has the domed central space of the true Byzantine type of plan, but the dome is carried across the angles by arches, in place of a pendentive. Another interesting church is the one at Dighour figured in Texier's *L'Arménie et La Perse*, in which also the plan shows a wide central space between massive piers and narrow side-aisles, with a cupola which is a polygon externally and internally a dome of conical section—a unique example as far as at present known. Fergusson, in contradiction to Texier, assigns to this church a comparatively early date—seventh century; and is probably right, judging by the characteristics of the architecture. Attention has been drawn by Ramsay and Bell's book *The Thousand and One Churches*, to a collection of small ruined churches of more or less Byzantine type in a district in the middle of Asia Minor; but the importance and interest of these very dilapidated fragments of local churches seems to have been rather exaggerated; at all events the subject has little or no bearing on the main history of architecture.



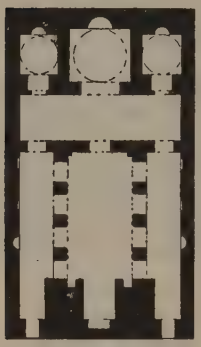
210.
Plan of St Nicodemus, Athens.



211.
Plan of Church at Daphni.

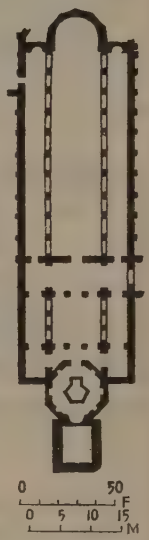
A side glance should be bestowed, in passing, on the evidences of Byzantine influence to be seen in the plans of some of the ancient Coptic churches of Egypt—churches of the Christianised population of Egypt, not very certainly dated, but of a period probably not long subsequent to the rise of Byzantine architecture at Constantinople. These are mostly of the aisle type of plan, but combined with square domed compartments which are obviously of Byzantine suggestion. The plan of the church of Deïr-Baramous (212) with its three domed compartments at the east end, given by Gayet in his work on

Coptic art, may be taken as a typical example. The nave is barrel-vaulted, and there is no central dome, but the three domed compartments betray Byzantine influence. As is pertinently remarked by Russell Sturgis in the article, "Coptic Architecture," in his dictionary: "It argues great vitality in the Coptic architecture proper that, in the sixth century, it did not take over the Byzantine style in its completeness." Coptic architecture, however, can only now be regarded as a backwater outside of the main stream of architectural development.

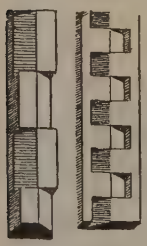


212. Plan of Coptic Church at Deïr-Baramous.

The influence of Byzantine architecture was felt in other regions besides those in which churches of Byzantine plan are found grouped in a collective form. The church of San Lorenzo at Milan, known to have existed in the eighth century as an important church, but much altered and rebuilt in the sixteenth century, is now a square church with a broad, shallow apse on each face, but it is believed to have had originally a dome above the square plan, and to have been in its general form suggested by Hagia Sophia. In the churches of Istria and Dalmatia there is much detail of Byzantine character; in the church at Parenzo, though it is a Basilica plan and not the Byzantine plan with the central space, the capitals are absolutely Byzantine in form and treatment. In some of the Sicilian churches, such as the cathedral of Monreale (195), though built in the twelfth century by Saracenic workmen under Norman rule, the decoration in marble inlay and mosaic, on the ambones and in other positions, evidently owes a great deal to Byzantine Art. Venice, even apart from St Mark's, is full of Byzantine influence. Panels with interlacing ornament are found which resemble much similar work at Ravenna; the peculiar form of zigzag dentil, found in use in Venice (214), is a Byzantine detail, and is traceable back to Sassanian buildings. The cathedral at Torcello (201 and 203), founded in the ninth century, is a Basilica church containing Byzantine detail; and the plan of Sta Fosca, close to it, a Greek cross with a central space, is of the Byzantine type, and was probably intended to be domed; it may be a question whether the dome was ever actually built, but arches were thrown across the angles of the square in preparation for it.



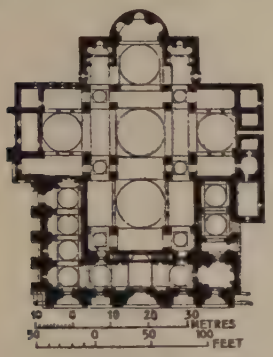
213. Plan of Church at Parenzo (6th century).



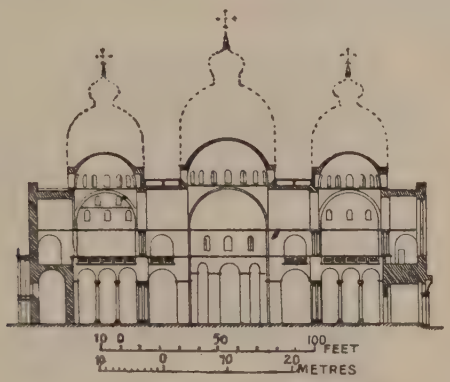
214. Venetian Dentil Ornament.

But the most remarkable example of Byzantine influence in Italy is the church of St Mark at Venice, which, in spite of its geographical position,

is architecturally, to all intents and purposes, a Byzantine church. It has the plan (215) so often found in later Byzantine churches, showing a group of domes symmetrically placed in regard to a central one, only that

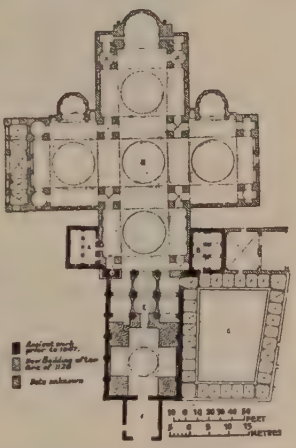


215. Plan of St Mark, Venice.



216. Section of St Mark, Venice.

in this case one of the subsidiary domes, on the axis of the nave, is the same size as the central one. The domes, as seen internally, are semicircular in section (216) and carried on pendentives, like those of Hagia Sophia ; the capitals are mostly of the same beautiful and effective style ; the vaults are decorated with mosaics of Byzantine type ; such a detail as the pierced panel (200) with the Greek cross in the centre is essentially Byzantine. The immense timber "bonnets" subsequently erected over the structural domes, for exterior effect, are anything but Byzantine in style ; they seem rather due, if anything, to the influence of Saracenic models ; but as an interior (202), if not in the details of its exterior, it is Byzantine architecture. The plan of St Mark's, again, influenced that of St Antonio at Padua (185), a cross church with six domes, four on the axis of the nave and two over the transepts ; though in this case the Byzantine character was not carried out in the details.



217. Restored Plan of St Front, Périgueux.

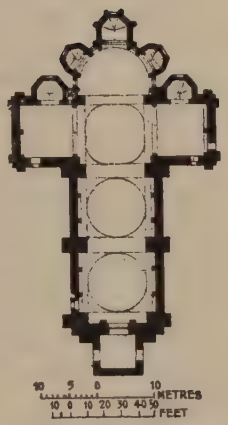
An almost equally marked, and a more surprising instance of the extension of Byzantine influence beyond its usual field, is that afforded by the remarkable group of churches in the valley of the Charenté in the South of France, at Périgueux, Angoulême, and Souillac (and farther north at Fontevrault). We should probably be right in supposing that the Byzantine influence came into this district through the medium of St Mark's, though there is no known

historical circumstance that would account for its development in this particular district of France. Some of these churches, it is true, present the Basilica form of plan, but they are all roofed with stone domes, and the plan of the most important one, that of St Front at Périgueux, (217) is obviously based on St Mark's plan. The construction is a series of broad cross arches, slightly pointed,

218. Interior of St Front, Périgueux (12th century).

with domes on pendentives between them (218). The domes, externally, have a treatment unlike anything else in domed architecture; the lower portion looking like the drum of a dome with pilasters, but built with a conical slope and finished with a cornice, above which comes a dome of somewhat pointed section, finished externally in masonry. The church at Souillac has three domed compartments in line (219), the internal treatment being otherwise almost exactly similar to that in St Front, St Etienne, Périgueux (218), shows two square blocks of building, one higher than the other, each roofed with a

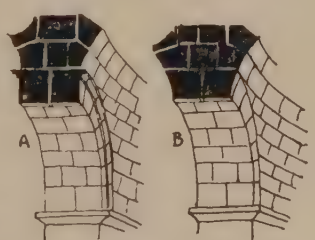
dome, and the higher one decorated externally with high narrow wall-arcades running up the whole height of the building—a feature which recalls Firouzabad with its wall-arches on the flank elevation (pages 106, 107), and may be compared also with the similar high and narrow wall-arcading in the church of the Apostles at Thessalonica, attributed by Fergusson to the eleventh century. And there, too, as at Périgueux, small windows are inserted high up in the wall, between the pilasters of the wall-arcade. That the builders of the one should have had any knowledge of the other is practically impossible, but the similarity is one of the many curious instances which occur in ancient architecture of the wide prevalence, at one time, of a special manner of building, even at places far apart from each other. Probably in such cases buildings which would have filled up the gap, in a topographical sense, have disappeared. In regard to St Front it should be added that it was formerly assigned to a period earlier than St Mark's, Venice; but Spiers, in *Architecture East and West*, has shown the improbability of this early date, and that the church now existing is that which replaced the one that is recorded to have been burned in 1120.



219. Plan of Church at Souillac.

220. St Etienne, Périgueux.

A peculiarity in the pendentives at St Front is that their curve springs from the inner edge of the voussoirs of the arches instead of from their outer line or *extrados*, the face of the voussoirs themselves forming part of the curve of the pendentive, as at B, Fig. 221. The effect is not so good as when the ring of voussoirs is left to form, as at A, a framing to the pendentive. In the carved capitals there is less appearance of Byzantine influence than in the plan and roofing; the dosseret does not appear, and the capitals, as in other twelfth-century work in France, to be referred to elsewhere, have much more of the outline of the classic Corinthian capital, somewhat clumsily imitated in a free and rather naïve manner. It is to be regretted that the historic value of St Front has been much impaired by the drastic restoration carried out by French architects under the auspices of the "Commission des Monuments Historiques,"



221.

which too often succeeds in obliterating architectural history under pretence of repairing or restoring architectural design. But the group of churches to which it belongs forms one of the most remarkable episodes in the history of architecture, and a singular example of a special and strongly marked variety of the Byzantine type, confined within narrow geographical limits.

Byzantine architecture at its best, which really means as seen in the interior of Hagia Sophia (for there is nothing else to equal that), is a remarkable combination of qualities not often found together ; it seems to combine the refinement of Greek detail with the warmth and the colour of Oriental art. From the spirit of display which characterises Roman architecture it is as alien as possible. Only in its treatment of the human figure in mosaic decoration does it approach the barbaric, though in the change from ideal realism to convention we can read something of the mentality of the age, and it would be a grievous mistake of judgment to criticise the Art of one age on the literal standards of another.

The great domed churches of the more modern period of architecture belong, of course, to another chapter ; and truly they owe much to other as well as to Byzantine influence.

A.D.	EVENTS IN GENERAL HISTORY.	ITALY AND SICILY.
200		
300	Advent of Sassanian Dynasty in Persia.	
400		Tomb of S. Helena, Rome. Domed building, Spalato. Tomb of S. Costanza, Rome.
500	Honorius : Ravenna seat of Western Empire. Attila's invasion of Italy. Odoacer, King of Italy : end of Roman Empire. Theodoric takes Ravenna.	Minerva Medica, Rome (?). Tomb of Galla Placidia, Ravenna. Tomb of Theodoric, Ravenna.
600	Chosroes, King of Persia (531–579). Justinian, Emperor of the East. Ravenna made an exarchate. Persians defeated by Tiberius.	S. Vitale, Ravenna. Churches at Parenzo and Grado.
700	Jerusalem taken by Mohammedans under Omar. Republic of Venice founded.	
800	Charlemagne, Emperor of the West.	San Lorenzo, Milan.
900	Saracens possess Sicily.	Cathedral and Santa Fosca, Torcello (?).
1000		
1100	Norman kingdom of Sicily founded. First Crusade and taking of Jerusalem.	Cathedral, Torcello : nave rebuilt. Santa Fosca rebuilt except side apses. St. Mark, Venice.
1200	Jerusalem taken by Saladin.	Cathedral, Murano. Cathedral, Monreale.
1300	Normans driven from Sicily.	S. Antonio, Padua.

ARCHITECTURAL MONUMENTS.

Constantinople.	Persia, Syria, Asia Minor, and Palestine.	Athens and Egypt.	France.
	Church of Holy Sepulchre, Jerusalem. Palace of Serbistan.		
	St George, Thessalonica. Palace, Firouzabad.		
St Sergius. Hagia Sophia.	Church at Ezra. Palace at Ctesiphon. Golden Gateway, Jerusalem. S. Demetrius, Thessalonica.	Coptic churches in Egypt.	
	Church of Holy Sepulchre destroyed by Persians. Palace at Mashita. Church at Dighour (?). Dome of the Rock, Jerusalem.		
St Irene.			
	Various ruined churches of Byzantine type in Asia Minor,		
Church of the Theotokos.	probably of ninth or tenth century.		First church of St Front, Perigueux.
	Church of Holy Sepulchre restored. Church of the Apostles, Thessalonica.	Byzantine churches at Athens.	St Etienne, Perigueux.
			St Front, Perigueux (rebuilt after fire).

CHAPTER IV

FROM ROMANESQUE TO GOTHIC

It was observed in speaking of Diocletian's palace at Spalato (page 97) that some of the details to be found there had such a remarkable significance in their bearing on the subsequent development of Romanesque architecture out of the materials of the Classic styles, that they might better be more especially noticed in the present chapter.

The Roman practice of imposing the columnar *motif* against an arcaded wall treatment has already been noted. It was in the palace built by Diocletian at Spalato, near the close of the third century, that we find for the first time, in a large and important building, a series of arches sprung straight from the capitals of a row of columns, without the intervention of any entablature, and the arcade frankly carrying the entablature, without the interposition of any superfluous wall-columns or pilasters appearing to carry it. It is true that the entablature still asserts its traditional position as the proper crowning of the wall, above the arcade, and is carried over the arch at the end of the court; though this arching of the entablature may have been carried out a century and a half earlier, in the Propylæa at Damascus. But the main fact is the existence at Spalato of a complete arcade springing from the capitals of the columns and carrying the superstructure; the work of an architect (whoever he was) who had the faculty of thinking for himself, and who felt that the orthodox applied Order, appearing to carry the entablature, had become a superfluity. Here was the germ of the mediæval arcade. The old section of the architrave, with its sunk faces and crowning moulding, follows the line of the arches, but is here only an appropriate margin or emphasis of the arch, such as general conditions of architectural design would demand.

What is commonly called "Romanesque" architecture did not spring immediately from Roman architecture, but belongs more especially to a period that may be roughly comprised as extending from the ninth to the twelfth century; and Romanesque, though it developed into Gothic, was in itself a kind of architectural culmination, the achievement of a consistent style of round-arched and vaulted buildings, still retaining in the round arch the reminiscence of its Roman origin. The intermediate phase between Roman and Romanesque is that which has not unsuitably been defined as the Latin style, seeing that it arose out of the development of the Latin Church after the time of Constantine; and this style was in its inception very closely connected with some forms of purely Roman architecture. The word "Romanesque" has been and might be applied to the architecture of the whole period between the decline of Roman and the rise of Gothic architecture, but the division into "Latin" and "Romanesque" is more logical, inasmuch as the Latin buildings were roofed with timber, and the Romanesque buildings were ultimately

vaulted in stone—a structural difference which has an important bearing on architectural style.

In considering the history of the development of architectural style from Roman through Latin and Romanesque into Gothic, two points are to be especially noted. One is, that this is a change from the external to the internal ranging of columns, or supports which do duty as columns. This alternation of columns between exterior and interior positions, this shifting, as it were, of the architectural scenery, is one of the most remarkable and significant facts in the history of architecture. In Egyptian architecture, except in its latest period when it was to some extent under Roman influence, the columnar effects were all internal. In Greek and Roman architecture the columns emerged from their obscurity and were ranged on the exterior of the temple. In Latin and Romanesque architecture, mainly for structural reasons which we shall have to follow out, the column became again an internal feature, and with the development of Romanesque architecture, it began to change from the simple cylindrical shaft into that compound form which is properly called not a "column" but a "pier"; a change which, as we shall see, was also closely connected with the provision for, and the expression of, structural conditions. The second point is that, as the history of Egyptian and Greek architecture, and in great measure that of Roman also, is the history of temples; that of Latin, Romanesque, and Gothic architecture is the history of churches, and of one special form of church—the long building divided longitudinally into aisles by colonnades or arcades, which, whether in the form of Basilica, Romanesque Church, or fully developed mediæval Cathedral, is the architectural expression of Latin Christianity.

It is important to keep before the mind the significance of this long plan with aisles; because the contrast between this and the typical plan of the Eastern church, in which the square form of plan with a central space predominates, enables us to form a better classification as between Byzantine and Romanesque work. As noticed in the last chapter, there are churches of the Latin plan in which there is detail which is essentially Byzantine; on the other hand, in some buildings of generally Byzantine type there are details, such as wall-arcading, which are very similar to those found in Latin and Romanesque churches; and in some works on architectural history—even in Fergusson's extensive and detailed history we see it—the authors have evidently found great difficulty in separating Byzantine and Romanesque and defining their respective limits. Fergusson has a chapter headed "Byzantine-Romanesque," under which he includes (oddly enough, as it seems to the present writer) such churches as San Miniato and Pisa Cathedral. But if we keep in mind that plan is the base of design and to a great extent the basis of style, the classification becomes much simpler and more logical. In the previous chapter we considered Byzantine architecture and the domed type of building with the central space; in the present one we will fix our attention on the long type of building characteristic of the Latin church, and its development from a Roman origin into the round-arched and vaulted Romanesque church on the same general plan.

In what may be called "the ages of faith" in architectural history and criticism, it was assumed and taught that the early Christians possessed themselves of some of the Roman basilicas, built for secular and business purposes, and utilised them as churches; hence the name "Basilica" applied to the early form of church. The genesis of the aisled form of the Latin church is not, however, quite so simple a problem as that; it is still somewhat conjectural and will probably always remain so; but it seems probable that the influence of the Roman basilica on the church consisted mainly in determining its structural treatment in section, along with one other suggestion in plan, that of the apse, which may be due to the pagan basilica, but if so, was adopted in a different sense and with an important modification.

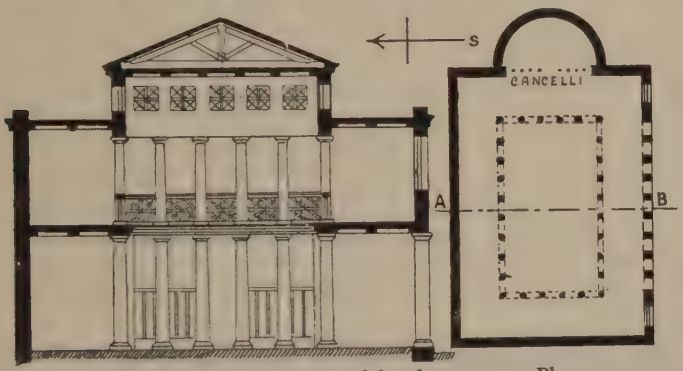
It must be remembered that before the time when Constantine officially accepted Christianity, Christian worship must have been long carried on, first in secret hiding-places, such as the Catacombs; then, as the religion was tolerated and openly professed by persons of wealth and position, in the better class of private houses, especially in their colonnaded *atria*.

222. Plans of *Scholæ* at Pompeii.

A "private basilica" in a dwelling-house could hardly have been of common occurrence; there was one in Domitian's palace at Rome; but it could only be an appanage of a palatial class of residence. In its general sense, however, the suggestion that assemblies for worship began in the larger apartments of private houses is probable enough; and if the *atrium* of the house were the place of meeting the columned aisle might be already suggested. The basilica in Domitian's palace appears to have had internal colonnades, not so much for structural necessity as for architectural effect, as they were ranged very close to the outer wall; but this, as already observed, must have been a rather exceptional incident. But Baldwin Brown, in his treatise *From Schola to Cathedral*, while admitting the idea of the service in private houses, suggests also the use of some of those buildings for meetings and the transaction of business, on a smaller scale than the basilicas, which were called *scholæ* or *curiæ*, and gives plans of two of them (222) from Overbeck's plan of Pompeii, one of which, a rectangular apartment with a large semicircular apse at one end, really represents the idea of the basilica church plan in miniature, except that the proportion of width to length is greater, and that there are naturally, in a building on this small scale, no colonnades dividing it into centre and side aisles.

Admitting these suggestions of the use of private houses and of scholæ for the celebration of worship in the early period of Christianity, when it was only, at best, under toleration and its meetings carried on with a certain privacy; with the greatly increased numbers of such congregations after Christianity had emerged into full daylight under the fostering sway of the first Christian emperor, there would naturally arise the necessity for much larger buildings

for the accommodation of the more numerous congregations ; and it was here that the sectional structure of the basilica as described by Vitruvius (223), with its low side aisles and internal columns supporting a loftier centre, with openings for light above the colonnade, must have attracted attention as the architectural solution of the problem. It provided the means of conveniently roofing over and lighting a wider area than that of the private atria or the public or semi-public scholæ. Nor is it impossible that some existing secular basilicas may, under some circumstances, have been utilised and converted into churches ; but for that purpose they would have needed at least one very important structural alteration. For the colonnade of the typical basilica was returned across each end of the building as well as down the sides. The Pagan basilica was an all-round interior, in which neither end was specially treated, and the entrances were at the side, giving upon the Forum or other open space which



Section on line A—B, twice the scale of the plan. Plan.

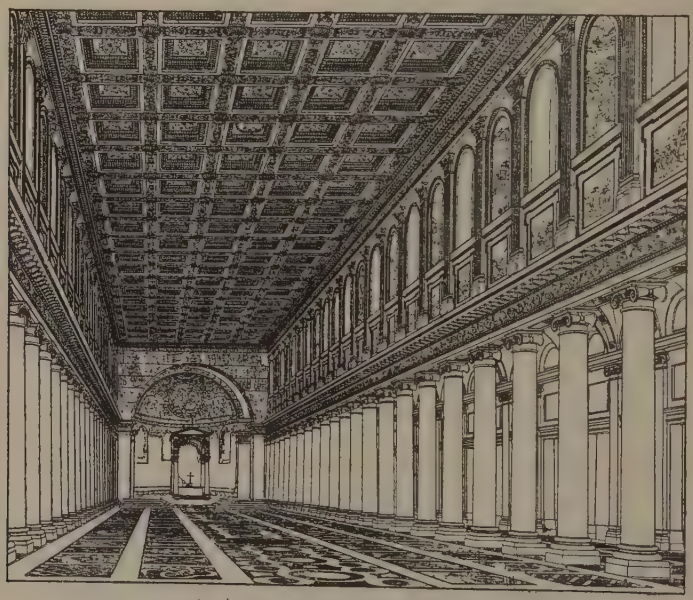
223. Typical Plan and Section of Pagan Basilica.

it flanked ; the type required for the Christian church was an interior entered at one end, and with an open vista to a sanctuary at the farther end. The fact that some of the Pagan basilicas had a semicircular annexe or apse at one end—occasionally perhaps at both ends—has been rather too hastily assumed as the origin of the apse at the end of the Christian basilica ; but it must be remembered that where such an annexe existed it was not part of the main interior of the basilica, it was a court for separate purposes, and was screened off from the basilica proper by the return colonnade at the end ; whereas in the Christian basilica the apse, and the Holy Table—placed, at the earliest church period, on the chord of the apse and not against the eastern wall—was the most important feature towards which the eyes of all the congregation were to be directed. On the whole, therefore, it seems probable that the apse of the Christian church was not suggested by the semicircular annexe (where it occurred) of the Pagan basilica, but was more likely to have been developed from some such buildings as the schola with an apsidal termination opening straight out of it. And in fact, so suitable was the apse for enclosing the Holy Table, and forming a position for seats round it for the officiating clergy, that we might

224. Plan of Basilica of S. Maria Maggiore, Rome.

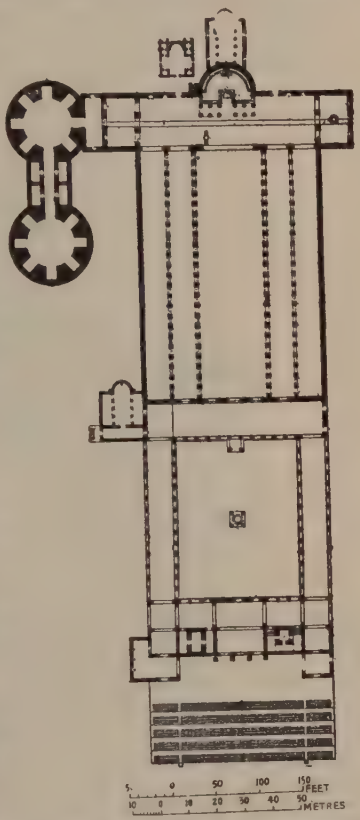
even suppose it to have been adopted from its inherent suitability, apart from any architectural precedent.

As the outcome of these various influences we have, as the type of early Christian church, a long building (223) divided by rows of columns into three, or occasionally five, avenues, of which the centre one was considerably higher and wider than the others, the vista of the centre compartment being closed by a semicircular apse. The columns are believed to have been, in the majority of cases, the spoils from destroyed classic structures. The colonnade in some cases carried a horizontal entablature of quasi-classic design; in other cases a series of round arches. Above the colonnade or arcade there was a considerable space of blank wall, and above that a series of generally rather small windows, occupying the position and fulfilling the function of what in Gothic architecture came to be called the "clear-story" windows. The typical character of the basilica church interior is shown in the view and plan of S. Maria Maggiore, Rome (224 and 225). The existence of the blank wall in the centre portion of the height of the nave walls has some bearing on the question of the historical connection between the Pagan and the Christian basilica. In the former the space above the ground-story colonnade was usually occupied by an open gallery, also screened by a colonnade. If the Christian basilica developed from the Pagan one,



225. Basilica of S. Maria Maggiore, Rome (432).

the reason why this gallery was omitted is obscure, for it would have been very serviceable for the additional accommodation of crowded congregations. Baldwin Brown's reply is that the omission is explained if we regard the Christian basilica as derived, not from the Pagan basilica, but from the schola with its blank side walls, and consider the colonnade as inserted in the lower portion of the wall to admit of the addition of the aisles which were necessary to enlarge the area, without increasing the width of the central space to be roofed over. As he observes, although the blank portion of the wall was often utilised for paintings of sacred subjects, it is not reasonable to suppose that the builders would have omitted such an important and useful feature as the open gallery merely for the purpose of providing wall space for paintings. Adopting this view, we may say that what the Pagan basilica furnished to the architectural scheme of the Christian basilica was the sectional design of the raised centre, with its range of windows high up, and the lower side aisles; by means of which the floor-space could be increased without making it necessary to roof over the whole space in one span. The roofs both of nave and side aisles were of timber, covered by a flat ceiling which was probably treated decoratively. The exterior, as far as can be judged by still remaining exteriors or portions of them, was of the greatest simplicity; the architectural effect was reserved for the interior.

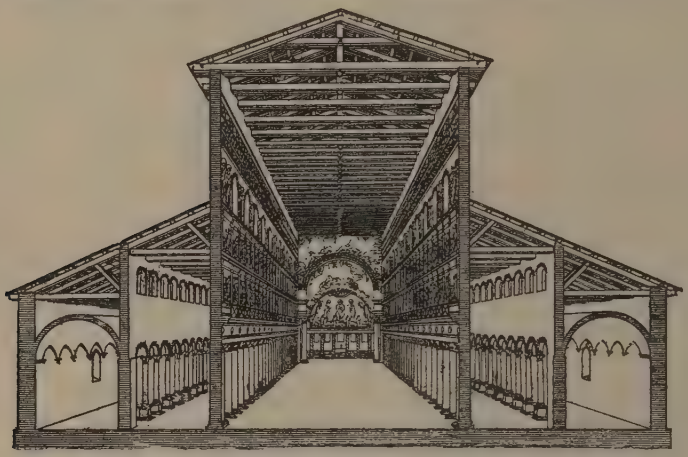


226. Plan of Old St Peter's, Rome.

Simple as the general scheme was, it was admirably adapted for a severe but impressive internal effect, entirely in keeping with the object of the building. The perspective of the colonnades, leading up to the apse which, with its mosaic decorations comprising the figures of saints or angels, symbolised the central rite of the Christian religion, gives a broad unity of design with which any degree of decorative richness in detail may be combined without disturbing the general effect. For worshippers in the aisles, the column obstructs less of sight and sound than the compound pier of the mediæval church, and it is more easy to attain good acoustic qualities (if that is considered of importance) than in a vaulted building of the Gothic type. It may be questioned whether the basilica form is not, even now, the best and most suitable for a modern church, besides being the one with the most venerable tradition behind it.

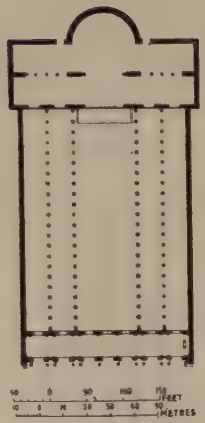
The Gothic is the style of the mediæval church, not of the original Christian church.

The largest and in some respects the most remarkable of the early basilicas was the great five-aisled basilica of St Peter's (226 and 227), built at the order of Constantine on part of the site now occupied by the great Church of the Renaissance, and of which drawings were fortunately preserved when it was removed in the fifteenth century to make way for its still greater successor. The main walls of the nave were carried on a colonnade with a horizontal entablature, above which was an immense mass of walling, and decorated with paintings and partially pierced with windows. The columns separating



227. Perspective Section of Old St Peter's (commenced 306).

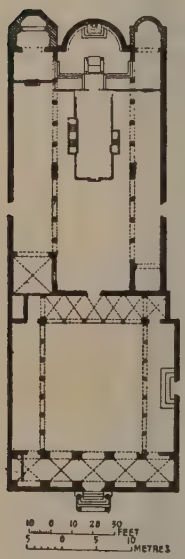
the two outer aisles on each side carried an arcade. The Church of St Paul Without the Walls (228 and 229), built about eighty years later, was to a great extent a repetition of St Peter's, except for the great improvement of having an arcade of round arches on each side of the nave, instead of the horizontal entablature, thus, in effect, relieving the colonnade of an overpowering superstructure. A modification in the plan was that the open space between the apse and the nave arcade, called the *bema*, was enlarged to the same width as the nave. This space, which, as shown in the plan of St Peter's, is obviously provided for convenience of access to some side apartments and perhaps for the purpose also of marshalling communicants without inconvenient crowding, may be compared with the *transept* of the Romanesque and mediæval church. When the cross form of church plan was fully developed, the transepts became a structural necessity to form abutments to the great arches east and west of the crossing space (more especially when a central tower formed part of the scheme) ; the idea that the transeptal plan offered a symbol of the cross may have been therefore a coincidence welcomed in mediæval times, when love of symbolism was very prevalent. The great arch which separated the end of the nave arcade from this open space was an



228.
Plan of Basilica of
S. Paul, Rome.

229. S. Paolo fuori le Mura, Rome : as it existed before the fire in 1822 (commenced 386).
From an Engraving by Piranesi.

important architectural feature. An important feature, in some of the basilica plans, as in that of old St Peter's, was a square colonnaded court or atrium in front of the main façade, and forming the approach to it. This may have been a suggestion from the Pagan basilica. Vitruvius, after specifying the proper proportions of length and breadth for the hall of the basilica, adds that if the site is too long for a building of this proportion, a *chalcidicum* may be added : " Sin autem locus erit amplior in longitudine, chalcidica in extremis constituantur, uti sunt in Juliâ Aquilianâ." He does not explain what the chalcidicum is ; Choisy translates it a " salle des pas-perdus," which may be accepted as a not improbable rendering ; and this may have suggested the atrium in the Christian basilica. And the idea of the atrium, even where it could not be carried out on account of want of space or for any other reason, left its mark in the shape of the *narthex*, or shallow columned porch stretching across the entrance end of the church, as in S. Maria Maggiore (224), and in many other examples. This evidently is one avenue of the atrium retained while the others are omitted.

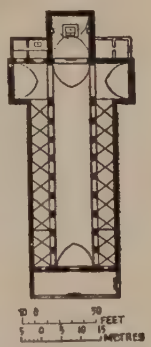


230. Plan of S. Clemente, Rome.

The basilica type of church is to be found in greater numbers in Rome than in any other neighbourhood, and prevailed there for a longer period than elsewhere, owing to the influence of church tradition there. Among the Roman basilicas S. Clemente, founded probably in the fifth century, but rebuilt on its old lines in the eleventh century, still retains a good deal of its original condition, and is one of the few basilica churches that retains its atrium (230). Both the atrium and the nave have an order of Ionic columns, the columns in the nave carrying arches with the form of architrave over them which, as in the example before referred to at Spalato, is really the classic architrave, with its upper moulding and sunk fascias, bent into arch form. What is singular, however, is that along with this use of part of the classic entablature as an arch, the capitals retain the old Roman practice of the entablature imposed above them, but much shallower and less noticeable than in the Roman vaulted buildings of the classic period. One of the aisles, for some local reason not now intelligible, is considerably wider than the other. Within the four eastern bays of the nave is the choir enclosed by railings (*cancelli*—hence " chancel ") which was introduced into the basilica churches as the clergy became more numerous and could no longer be sufficiently accommodated in the apse ; this internal railed-off choir of the basilica being eventually superseded by the external built choir of the mediæval plan. The colonnades of the nave are interrupted in the centre of their length by a long pier of solid walling ; a feature which also appears in the nave of S. Maria in Cosmedin in the eighth century, where similar long piers are interposed at every fourth bay of the colonnade. The interposition of these solid piers in the colonnade may, in

these two cases, have arisen from an idea that the long colonnade required some strengthening piers at intervals to prevent any tendency to settlement in either direction ; at all events, in these two instances it has no reference to any structural treatment of the roofing, which is a continuous succession of roof-trusses without any structural accentuation above these piers ; but, as we shall see, at a later period and in the Romanesque churches, this interposition of solid piers, with columns between them, came to have a structural function and meaning in connection with the treatment of the roof. In the case of these two basilicas, it was perhaps only a matter of architectural design, and as such not happy, since it interrupted the continuous perspective of the colonnade, which was one of the finest points in the interior effect of the basilica church.

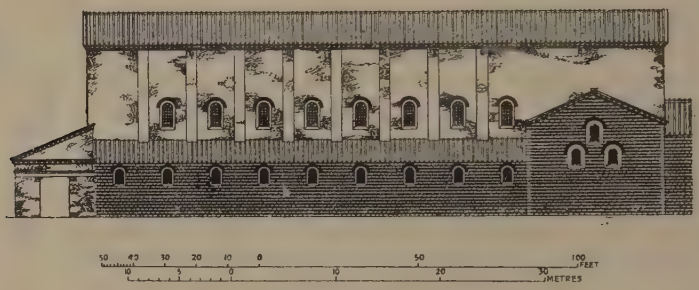
Among the Roman basilicas one of the most typical, as an illustration of simple breadth and dignity of interior design, is that of S. Maria Maggiore already mentioned, with its two long ranges of Ionic columns ; twenty-one bays with the end columns standing free from the walls, leading up to the single apse at the end of the vista. The small basilica of S. Agnese is an interesting instance with a rather special type of plan, the aisles being unusually narrow in comparison with the centre avenue, and the apse proportionately large ; the arcade carries side galleries with an upper arcade. S. Pietro in Vincoli (fifth century) shows the unusual and awkward-looking combination of a Doric colonnade carrying arches ; the plan is of interest in one respect, that the treatment of the nearly square space between the nave colonnades and the apse seems almost a forecast of the treatment of the crossing of the mediæval church, with its four arches ; the colonnade is stopped eastward by very massive piers, answered by corresponding piers at each side of the apse, and the intervals arched in each direction. There are small apses at the termination of the aisles, though perhaps not coeval with the main building ; there appears to have been a similar arrangement at S. Clemente ; and though this also may not have been original, the insertion of these smaller apses is significant as foretelling another feature of the Romanesque plan, in which the addition of small apses, apsidal chapels, facing eastward, was of constant occurrence. S. Giorgio in Velabro (seventh century) is interesting from its curious conglomeration of columns with Doric and Corinthian capitals, in some cases not fitting the columns, and the employment of the very questionable architectural trick of a false perspective, by narrowing the lines of the nave towards the east end. S. Vincent-alle-tre-Fontane, a very plain building of the early seventh century is of interest from a kind of proto-Gothic element in the architecture ; the nave arcade, of wider proportions than usual, being carried by square piers instead of columns (231), and the exterior shows at each bay, between the small windows, the flat strips of projecting walling (232) which, while they seem like crude reminiscences of the classic pilaster, foreshadow a feature which was to become of constant employment in Romanesque architecture, and was finally



231. Plan of S. Vincent-alle-tre-Fontane (626).

to develop into the Gothic buttress. Thus we see, at this early period, some of the *origines* of Gothic architecture first struggling into existence. The plan is also remarkable for showing a square end in place of the usual apse.

It is probable that the more important of the Roman basilicas, in their original state, were by no means destitute of richness of internal effect, from the employment of mosaic decoration and of marble columns, though they had not much of strictly architectural forms of decoration. They were also in some cases furnished with very richly treated flooring of mosaic or marble inlay, a good deal of which is still in existence. And the very dimensions of the three great five-aisled basilicas—St Peter, St Paul, and St John Lateran, must have given them, even in their primitive stage, a great deal of architectural grandeur. The width of the central nave of old St Peter's was over



232. S. Vincent-alle-tre-Fontane.

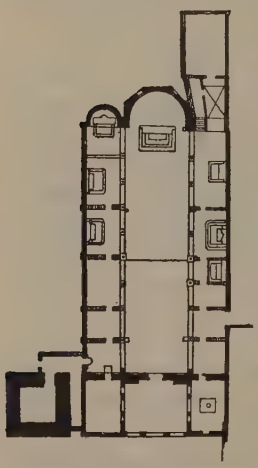
70 feet, and with the four aisles the internal width between walls was about 200 feet. St Peter's has gone, and both St Paul's and the Lateran church have been rebuilt, but so far on the original plans that their dimensions and proportions at all events remain.

Among churches of the basilica type elsewhere than in Rome, two of the most important and celebrated are the two at Ravenna, called respectively S. Apollinare Nuovo and S. Apollinare in Classe, or (as it might be put in English) " St Apollinaris at the docks." Both these churches are Roman in general plan and design, though both show, as might be expected from their locality, the Byzantine feature of the dosseret above the capitals of the nave arcades, besides a general Byzantine feeling in their decorations. S. Apollinare Nuovo has a finely proportioned arcade, with a decorated expanse of wall above it, and windows above, a good deal larger than are found in most of the Roman basilicas. S. Apollinare in Classe is, however, the more typical church of the two. As usual with the basilican type of church, the exterior (240) is exceedingly plain compared with the interior, but the decoration (if so it can be called) by exterior wall-arcading of slight projection has something in it of classic reminiscence. At this church we find one of the earliest examples of the tower or campanile as an addition to the church ; in this case circular on plan, an unusual form in Italy, as far as present evidences go ; but there may have been other towers of the same character which have been destroyed. The tower is

not an integral part of the architecture of the church, but stands a little apart though grouped with it, and this treatment remained in general a characteristic of Italian church architecture, where the campanile has commonly been treated as a separate erection, whereas in churches erected under Romanesque influence the tower was usually incorporated with the main design, of which, in the complete Gothic period, it became one of the most important and ruling features. Another important Italian example, founded some two centuries later than S. Apollinare, but rebuilt to a great extent in the early eleventh century, is that at Torcello, in the lagune of Venice (203). The special interest of this church consists in the fact that the apse, which may be part of the original church and is at all events of very early date, retains its stepped semicircular rows of seats for the clergy, furnishing thus an indication of the manner in which the apse was arranged in the early days of the Church.

On the eastern shore of the Adriatic, and especially about the northern portion bordering on the Gulf of Venice, is what may be called a land of basilica churches, most of which present the peculiarity of being Roman in plan and in general type, and to a great extent Byzantine in detail—the traces of that Byzantine influence which, commenced in Italy at Ravenna, spread round the shores of the Venetian bay, and culminated in the glories of St Mark's, Byzantine in plan as well as in detail. The most important of these basilicas on the Adriatic shore is Parenzo, on the peninsula of Istra, which dates from the middle of the sixth century, and was built on the site of an earlier church. The plan (213, page 118) is that of the columned and arcaded basilica, with a central apse and a smaller apse at the end of each of the side aisles ; this is perhaps the earliest instance of a basilica originally built with apses as terminations of the side aisles, as those in one or two of the Roman basilicas may have been subsequent additions. The apse has its circular stone seat for the clergy—in this case only a single seat with a raised step below it, not a series of rising seats like those at Torcello. The arcaded atrium remains, and there is an octagonal baptistery to westward of it ; both of these are believed to include some part of the work of the earlier fourth-century church. In spite of the completely Latin plan, the capitals, which differ very much in type, are in many cases distinctly Byzantine in character, and the marble columns (which Fergusson states to have been taken from some older edifice) were found by Hamilton Jackson to bear masons' marks similar to those on the columns at S. Vitale, and he considers that they were made in the same workshop. It is also to be noted that the apse is polygonal externally, which is also a Byzantine characteristic ; the apse of the pure Latin church being always semicircular on plan both within and without. Nevertheless, according to the principle we have adopted of taking plan and construction as the basis of our architectural classification, we must regard Parenzo as a Latin basilica with Byzantine details. In a somewhat similar category is the cathedral of Grado, on an island near the Gulf of Trieste, founded in the fifth century, though a good deal altered at a later period ; but in this case the use of old materials, so often met with in the Latin churches, appears to have prevailed largely ; the columns, says Hamilton Jackson (who has minutely examined

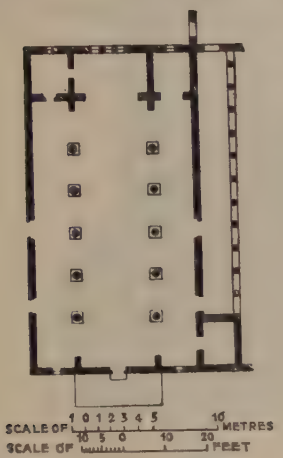
these basilicas of the Adriatic coast), are antique, but of varied material; the capitals, some of them decadent Roman and others Byzantine. Near this, on the mainland, is the basilica of Aquileia, founded in the fourth century, but rebuilt to a great extent in the eleventh, after damage by an earthquake. This has a wide nave terminating in an apse of nearly its own width; two subsidiary apses occur, not, as is more usual, at the ends of the side aisles, but as the eastern terminations of side chapels which form part of the quasi-transept of the typical Latin plan. The columns are of different materials and thicknesses, showing that here also they were taken from older buildings. Like Parenzo, Aquileia has its separate baptistery opposite the western end, and between them a curious nearly square arcaded narthex, narrower than the nave of the church, with clumsy-looking capitals of Byzantine type, with thick and heavy dosserets. It appears to have been ascertained that at Aquileia there were originally two basilicas side by side. Two later important churches on the eastern side of the Adriatic, those of Zara and Traù, though the main lines of their plans are Latin, for other reasons may be better classified as belonging to the transition to Romanesque. The same may be said of one or two other important churches on the Italian shore of the Adriatic, to which we shall return; but there is one, that of S. Maria, Pomposa, the date of which seems rather uncertain, but was probably somewhere in the tenth or early eleventh century, which retains the main characteristics of the Latin basilica—the long timber-roofed nave with an apse at the end, and the columns of varied material, from older buildings, in some cases pieced up with new material to make up their height; and a narthex, the nearly square centre portion of which, defined by cross arcades, may be said to be a reminiscence of the atrium (see plan, 233). There were apses at the end of each aisle; one of them has been removed to make a staircase to an adjoining building. There is a very strong Byzantine influence visible in the character of the capitals, and also in the fact that the central apse is a semi-octagon, externally. There is a lofty and important campanile (as usual in Italy, slightly detached from the church), divided by string-courses into nine nearly equal stories, and capped by a high conical roof of circular plan (243).



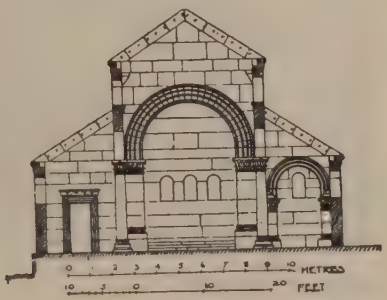
233. Plan of S. Maria, Pomposa.

The Coptic churches of Egypt, referred to in the last chapter as presenting some Byzantine characteristics, show also the influence of the Latin three-aisled plan (212, page 118), only that in place of the eastern apse, there are one or three square compartments at the east end, each roofed with a dome. This eastern dome at the end of a long plan affords a type of church which, if it had been systematically worked out on a larger scale, might have led to very fine results. The examples, however, are not important, nor can they be said to have had

any influence on the historic development of church architecture ; they form an episode only. In comparison with the Italian basilicas, it is remarkable how solidly these Coptic churches are built, and with what massive piers compared with the Roman colonnaded basilicas. It would seem as if their architects were affected by the proximity of the monumental remains of Egyptian architecture.

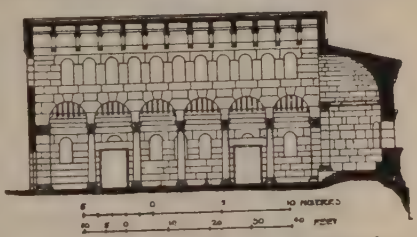


234. Plan of Church at Behio (6th century ?).



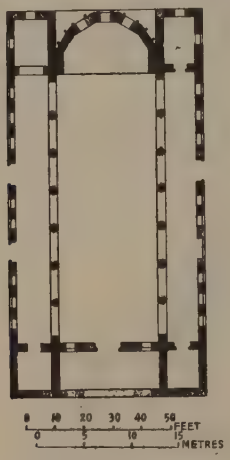
235. Cross Section of Church at Behio.

A more important side-chapter in the history of the Latin church is afforded by the remains of some of the remarkable churches of Central Syria, which have been the subject of special investigation and illustration by de Vogüé in his *Syrie Centrale*. Two of these may be mentioned, the churches at Behio and at Baqouza. Both of these are colonnaded churches of the basilican type, which had timber roofs ; that at Behio, however, shows the unusual feature of a flat wall at the east end instead of the apse. The section is given in Fig. 235. That of Baqouza, attributed to the sixth century, is on plan a normal basilica with an apse termination ; the section (236) shows that the arcade arches are rather wider in proportion than is usual in the Latin basilica, and the wall space between the arcade and the upper range of windows much less than usual in the latter. This is, in fact, in spite of its geographical position, a better proportioned and more classic-looking interior design than most of the Italian basilicas. The church at Tourmanin has a plan (237) and proportions somewhat similar. In both these churches there were a series of colonnettes on brackets, between the windows, to give additional support, real or apparent, to the ends of the roof-principals (see section, Fig. 238) ; a feature curiously resembling a kind of detail which was to become a special characteristic of subsequent Western Romanesque work. One or two others of these Syrian churches

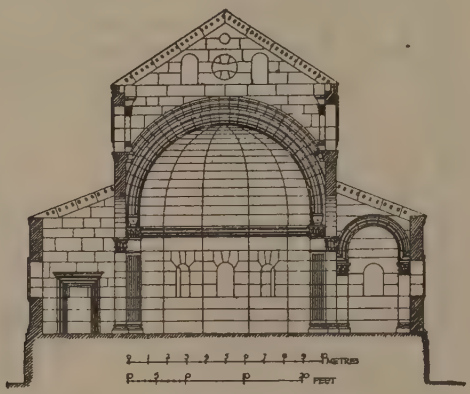


236. Longitudinal Section of Church at Baqouza (6th century ?).

differ in so important a manner, in their architectural setting out, from the typical Latin church architecture, that they may be better classed among the Romanesque types.



237. Plan of Church at Tourmanin (6th century ?).



238. Cross Section of Church at Tourmanin.

There is little of architectural ornament, properly so called, in the basilicas of the pure Latin type. The exteriors, as has been observed, are usually extremely simple in treatment ; the interiors show a curious variety of classic or quasi-classic capitals. But most of them were probably rich in the flat mural ornament produced by mosaic and by marble inlay, which in some of them, as in S. Clemente at Rome, was based on Roman forms—acanthus scrollwork and geometrical patterns ; while in others, according to date and place, ornament of a Byzantine character prevailed. In S. Apollinare in Classe and S. Apollinare Nuovo the soffits of the arches are panelled ; at S. Maria, Pomposa, they are decorated with inlaid ornament and marble ; at S. Clemente they are decorated in the more classic manner of carved foliage within one long panel. At Parenzo, while the soffits of the arches are plain, the walls of the apse are elaborately panelled in coloured marble in a manner reminding one of S. Sophia. At Torcello are some exquisite variations on the classic capital, with leafage of a somewhat more naturalistic order than the classic acanthus. At Parenzo the capitals are mostly of purely Byzantine character, and beautiful examples of that class of work. At S. Agnese in Rome the smaller columns above the

239. Pierced Window, S. Maria, Pomposa (10th century ?).

240 S. Apollinare in Classe, Ravenna (*c.* 550)

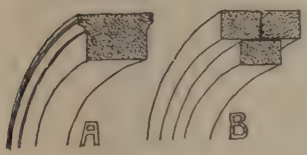
241 Courtyard in Palace at Spalato (early 4th century

242 Florence : Interior of S. Miniato (early 11th century)

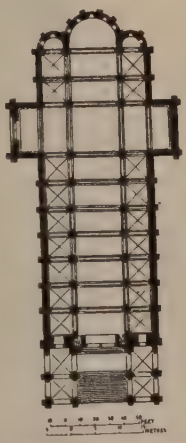
243 Pomposa : The Campanile (1063)

gallery are alternately vertically and spirally fluted; but the spiral fluting for small columns is in the main rather a Byzantine than a Latin feature, and is met with frequently in the supports of pulpits and other such objects of church furnishing, where Byzantine influence has been dominant. The narthex at S. Maria, Pomposa, has a little rich exterior ornament in the shape of carving on the archivolts of the arches, and two very remarkable small circular windows (239)—brick voussoirs outside, then a ring of flat carved scroll foliage, and in the centre a circular pierced panel, forming the window, with a tree and two animals forming a kind of tracery: all the details exceedingly Byzantine in character, and recalling the design of the circular panel from St Mark's, Venice, shown in Fig. 208.

The transition from the Latin type of church to that to which we are confining the title Romanesque cannot be definitely fixed in regard to either time or place; they overlap very much, and Romanesque tendencies appear in churches which still retain the general characteristics of the long nave and eastern apse, and the timber roof, either open or decoratively treated with a flat ceiling. But if we compare an early church of the Latin type with a church of fully developed Romanesque architecture, the differences are decisive and easily summed up. The Latin nave has colonnades with columns of classic type (often the spoils of destroyed classic buildings), set rather close together, for the basilicas commenced with columns carrying a horizontal entablature or lintel, and therefore were necessarily set rather close; and when an arcade was substituted for the entablature, the comparatively close position was still maintained, and the arches are of small span. In the Romanesque nave the arches are of much wider span, and instead of the classic column there is a pier of compound plan, and occupying a larger floor area than the column. The arches (when introduced) in the Latin basilica have a flat soffit of the same width as the thickness of the wall they carry; in the Romanesque churches the arches are recessed in two or three rings, the upper one only being the thickness of the wall, the inferior ones each receding (244); and the plan of the pier has a relation to the plan of the arch where it comes down on the capital, or, as we shall now call it, the "impost." The apse of the basilica church has lengthened out into a short choir which forms the eastern arm of the church, and the transept, which was only partially suggested in the basilica plan, has now also developed into an important feature with decisive projections, giving to the plan a well-marked cross form (245). The space above the nave arcade,

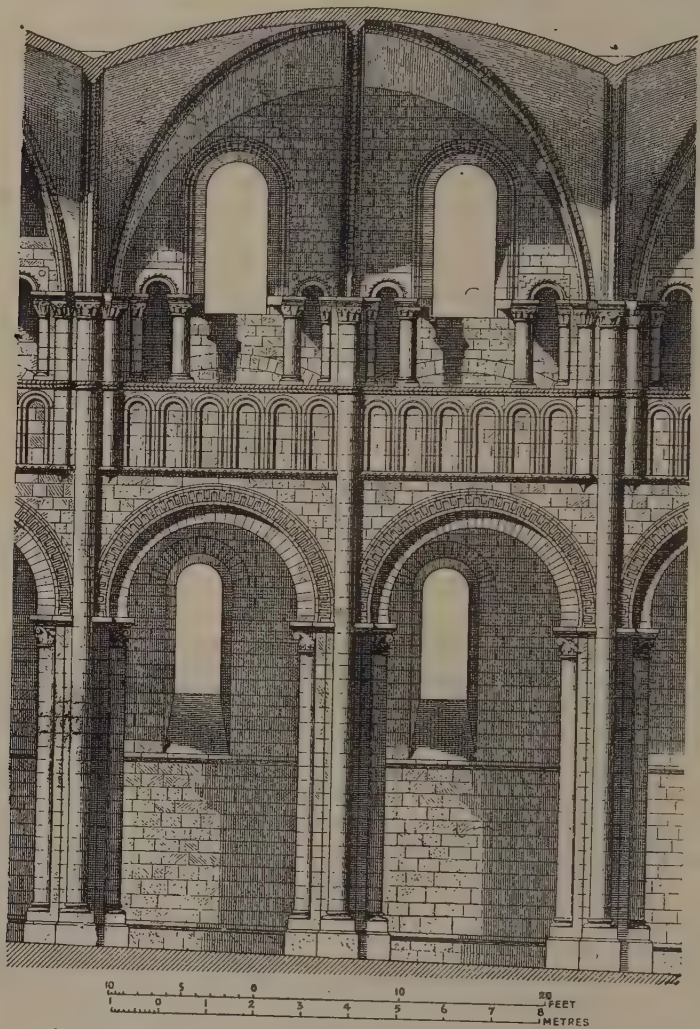


244.
A. Roman and Latin Arch.
B. Romanesque Arch.



245. Romanesque Church Plan (Autun) (late 11th century).

instead of being a flat wall for painting on, contains a built arcade of small arches, sometimes only veiling the space occupied by the aisle roof ; sometimes opening on a gallery above the ground-floor aisle. The roof is often vaulted



246. Complete Romanesque Architecture : La Trinité (Abbaye aux Dames), Caen (founded 1083).

in stone. Fig. 246 shows the main character of what may be called complete Romanesque architecture, in its best form, before it had begun to merge into Gothic ; except that the arcade above the main arches is usually larger than in this case, and open. It will be noticed that the recessed lower arch of the main arcade has a separate half-column on the pier for its special support ; the plan

of the pier being designed with special reference to the recessed arch; also, that the vaulting introduces a new feature in the pier, in the shape of the long column running up to take the springing of the vaulting ribs. A comparison of this architecture with that of the interior of S. Paul at Rome (229) affords the best possible lesson in the distinction between Latin and Romanesque architecture.

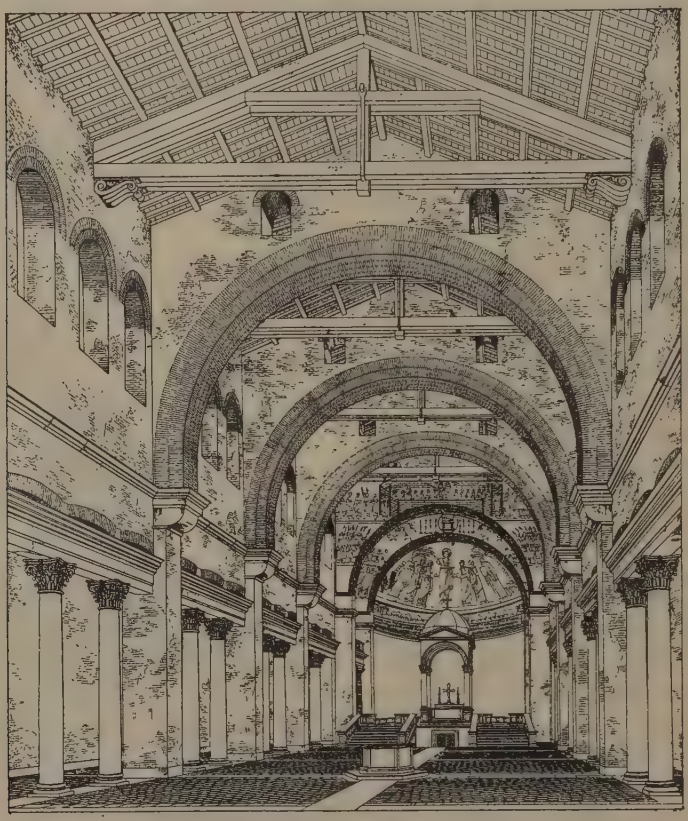
Externally the Romanesque church would show a series of wide, flat, pilaster-like buttresses corresponding with the main divisions of the bays of the arcade and vaulting, and a certain amount of mural decoration in the shape of wall-arcading; especially, in Italy and in the Rhineland churches, arcading immediately under the eaves of the roof. Fig. 247 shows some of the general characteristics of the exterior of a Romanesque building. The reader should compare these little strips of exterior buttresses with those shown in Fig. 232; they are a legacy from Latin architecture.

The Romanesque church may have a centre tower, or two western towers, or all three; or two towers placed in some other position than the west front; but the towers, at all events in France, Germany, and England, almost without exception, will form an integral part of the building, instead of being merely grouped with the church as a separate structure as in the Latin type of church, and in many later churches in Italy where this manner of isolating the tower still continued to be accepted.

247. Romanesque Exterior: St Radegonde, Poitiers (*c.* 1100).

The most important change from the Latin to the Romanesque building was undoubtedly the change from the timber roof with a flat ceiling to the stone vaulted roof. Some perception of this seems to have been first shown in the practice of building a solid arch over the nave at regular intervals, leaving the wooden roof between, but this to some extent strengthening it and connecting it architecturally with the walls. This was suggested in the

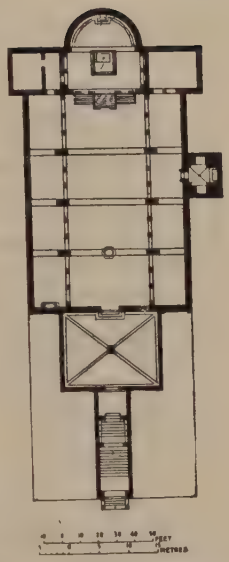
twelfth century in the Roman basilica church of S. Praxede (purposely passed over before), where at every third bay the colonnade is interrupted by a massive pier carrying a solid arch built across the church, the striking point (for a church of this date) being that the deep pier is placed crosswise, at right



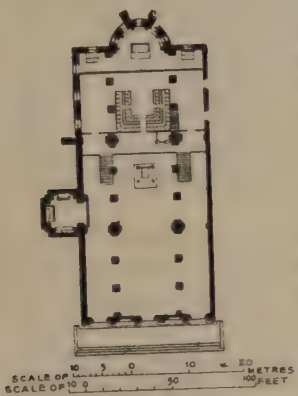
248. Basilica Church of S. Praxede, Rome
(early 9th century : the buttressed arches built in 12th century).

angles to the axis of the nave, and thus really anticipates the deep buttress of complete Gothic architecture (248 and 249). The entablature carried by the columns abuts against the sides of this pier, and the arch, at its springing, is corbelled forward into the church, so as to bring its thrust still farther inward. As Fergusson observes, the thing is clumsily done in detail, but it is a bold effect, and remarkable because it anticipates a principle of Gothic construction, and it suggests also the idea of an architectural connection between the roofing and the substructure. In S. Maria in Cosmedin, as we noticed, the colonnade is interrupted by solid piers at regular intervals, but these have no reference to any corresponding emphasis in the roof design. And this emphasising, at

rhythmical intervals, of the supports and of the roof structure, became a note of the transition to Romanesque ideals, even before the introduction of vaulting. The beautiful church of S. Miniato, at Florence, built early in the eleventh century, is in its main plan (250), a Latin basilica with the usual apse and the timber roof, but it has half-columns at every third pier, higher than the arcade columns, carrying a solid arch over the nave; the same general scheme as at S. Praxede but carried out in a much more refined and artistic manner; indeed, S. Miniato (242), in its clean lines and fine proportion of parts, almost seems like a forerunner of the spirit of the Renaissance.

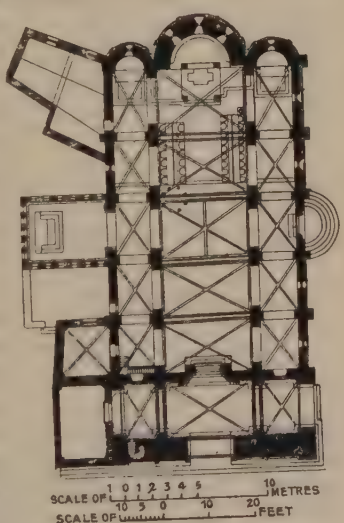


249. Plan of Basilica of S. Praxede, Rome.



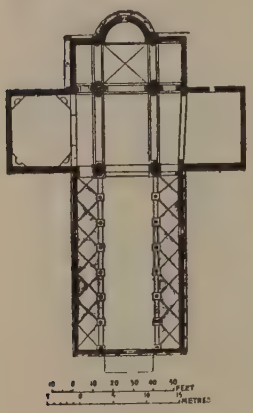
250. Plan of S. Miniato, Florence.

Returning for a moment to the basilican churches on the shores of the northern Adriatic, we find examples of the retention of the general plan of the basilica, coupled with evidences of a change in the architectural ideal. The cathedral of Zara, on the eastern coast, is as late as the thirteenth century, but retains the basilica plan, with an unusually wide central avenue closed by an apse of the same width. But one of the most marked characteristics of the Latin basilica, the unbroken perspective of the nave columns, has disappeared, and in its place we find large piers, alternating with cylindrical columns. There is no treatment of the nave roof corresponding (as at St Miniato) with the position of the piers; but the change from a continuous colonnade to alternating piers and columns is an important departure from the basilican ideal. The plan shows the Latin church arrangement of the closed choir, occupying the three eastern bays of the nave. In the cathedral at Traù, also thirteenth century, the main plan is the basilica with three apses, a centre one and one at the end of each side aisle—a typical Latin church plan so far; but here the place of the columns has been entirely taken by massive piers of T-shaped plan, widely spaced, and the whole church,



251. Plan of Traù Cathedral

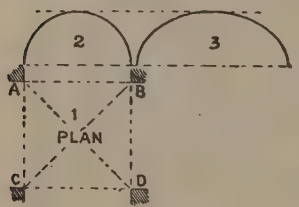
nave, and aisles, is vaulted in stone. Traù (251) is, in fact, a Romanesque church, though retaining the basilican form of the east end and the internal fenced-off choir ; while Zara, in spite of its basilica plan and timber roof, is a Romanesque church in detail—especially shown in its richly designed western doorway with four orders of receding arcades, and in the bold recessing of its exterior wall arcades so different from the flat character of Latin architectural detail. And on the Italian side of this curious architecturally debatable land of the Adriatic coast we find, in the cathedral of Troja, late eleventh and twelfth century, a fully developed transept plan with the apse at the end of a projecting eastern arm (252) ; yet this very advanced plan is combined with the columnar arcade and the timber roofing of the Latin basilica. It is as if the Latin and the Romanesque building ideal were in this district struggling for the mastery, with very varying results.



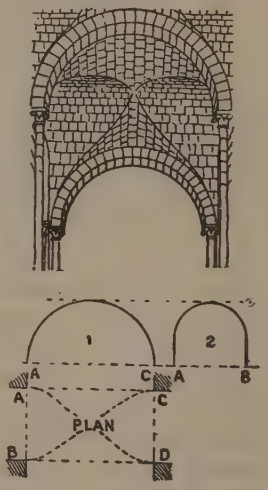
252.
Plan of Troja Cathedral (*c.* 1100).

But it is time we left this debatable land to consider the central origin and development of Romanesque architecture, especially in regard to its most important and formative feature, the vaulted roof.

The simplest form of the cross vault, as used by the Romans, has already been described (page 86), and how the thrust of the vault is all concentrated on the points in the wall from which the diagonal arches appear to spring (see 130, c.), so that if those points have sufficient abutment, we may play with the intermediate part of the substructure as we please. But in this simplest and primary form of vault there are two initial difficulties. The first is that the diagonal arch, formed by the intersection of the two semicircular vaults, becomes a flatter curve, an elliptical one, having, as a diagonal, to span a wider space with the same rise, and therefore becoming very flat at the crown (253), and consequently (especially on a large scale) with a tendency to sink at that point : secondly, that with the round arch, the two intersecting arches must be the same width, in order that their crowns may meet at the same level ; otherwise,

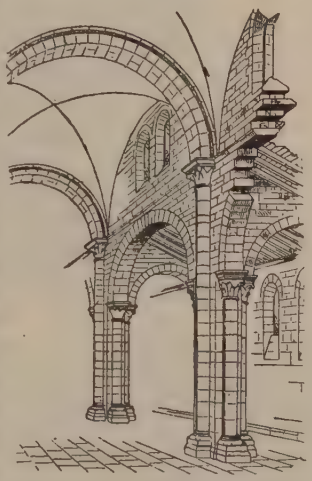


253.
1. Plan of Compartment.
2. Elevation of Transverse Arch A–B.
3. Elevation of Diagonal Arch C–D.



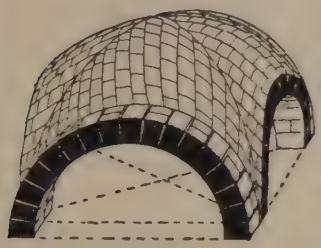
254.

to produce this result, the narrower one must be "stilted," *i.e.*, the actual arch must not commence till some little space above the springing of the wider one (2, 254); and the result of this intersection of two different arches would be to give the resulting diagonal arch a twisted line (254), not only awkward in appearance but all but impossible in structure.

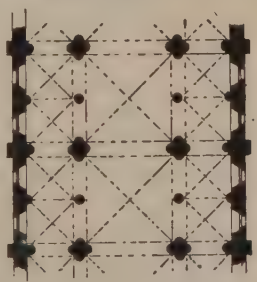


256.

The first difficulty was got over, during the Romanesque period, when only round arches were employed, by raising the crown of each compartment of the vaulting so as to make the diagonal arch a semicircle, the crowns of the intersecting vaults themselves rising in a slight curve from each margin of the vaulting compartment, so that each compartment of the vaulting had a domed section, supported on a semicircular cross arch at each end (255 and 256). The difficulty of the intersection of semicircular vaults of different widths led to an endeavour, as often as possible, to keep the vaulting compartments square in plan. With this object it was a common practice to make the side aisles exactly half the width of the centre avenue; then one bay of the centre vaulting went to two bays of the aisles, and all the compartments were square (257). It will be seen at once that this arrangement almost naturally suggests the alternation of large and small piers, or of piers and columns, in the nave arcade, the larger alternate piers taking the weight of the heavier centre vault: thus we see the intended construction of the roof affecting the planning from the ground level.



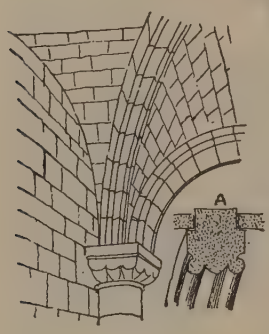
255.



257.

This early and simple form of vault with two diagonal ribs is called a "quadripartite" vault, as it divides the vaulting space, on plan, into four triangular sections. Now a vault of this kind may be regarded in two ways—either as a mere intersection of arched surfaces, making an edge at their meeting, or as two built diagonal ribs (called "groin-ribs") to which the intermediate surfaces conform. The quadripartite vaults of the Romans were always of the first description; and as their vaults were practically solid masses of concrete, this method served them perfectly well. But in vaults built of jointed masonry this mere edge of intersection is a rather weak point, requiring in any case a great deal of care in cutting and setting the stones; while an arched groin-rib,

against which the vaulting surfaces abut (258), is much more easily set out and built, and is besides a great strengthener to the vault at the point of intersection. Accordingly, at an early period in Romanesque vaulting the groin-rib method was adopted for all the larger vaults. Not infrequently, the central vault was built with groin-ribs and the side vaults with intersection edges only. At a later period, in Gothic vaulting, we shall find that the groin-ribs have become the real construction, the vaulting surfaces being only a light filling in between them, but it is not probable that this was the case in the Romanesque quadripartite vaults; the ribs and vaulting surface were probably set out and built simultaneously, but the groin-ribs served to strengthen the meeting edge and to simplify the work of the masons.



258.

A shows enlarged Section of Groin-rib and Vaulting Surfaces abutting on it.

Considering that the Romans were quite familiar with quadripartite vaulting, and had shown great examples of it in the Thermæ of Diocletian and the basilica of Maxentius, it is extraordinary that this method of solidly roofing a building seems, even in Rome itself, to have been lost sight of, or neglected for, several centuries. The conclusion would be that between the fourth and ninth centuries the art of building and the enterprise of builders had been in a very languishing condition. Even where an attempt was made at something more permanent than wooden roofing, it was only in a very crude manner. We have noticed the occasional introduction of solid arches across the nave of a church at intervals, in the wooden-roofed churches of the basilica type, as in S. Praxede at Rome, and in the earlier example of S. Miniato at Florence. It is not very obvious what constructive purpose these cross arches at alternate piers, or sometimes at wider intervals, were supposed to serve; they would have no doubt the effect of steadying and binding together the long arcades or colonnades of a nave, and the wall above the arcade, but they did not assist the timber roof in the interspaces, and came little nearer to rendering the building a homogeneous and monumental structure. But this device of building transverse arches across a building at intervals, heavier and more solid than the intermediate roofing, was carried out in a good many buildings in which the intermediate portions of the roof were also arched over in stone, before the idea of cross-vaulting was revived (we do not say invented, as it had already been used by the Romans). There are even examples of Roman building existing, and possibly there were many more that are destroyed, in which this system of reinforced cross arches is employed. In the remains of the amphitheatre at Arles there is a method employed of roofing a passage by a series of arches at regular distances, on which are placed flat slabs large enough to rest at each end on the extrados of two arches: and in one of the apartments of the remains of the Thermæ at Nîmes is a waggon-vaulted arched roof formed alternately of thick arches and thinner ones, the stones of the latter

259 Autun : the Nave (late 11th century)

260 Roofing Arches at Tafkha

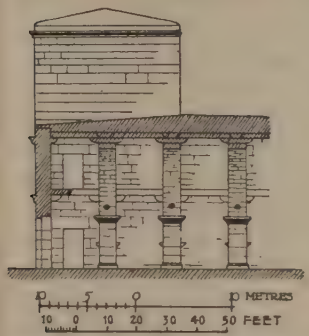
261 A Romanesque Capital ; from a demolished Abbey at Toulouse

262 St Michael, Hildesheim, 1031-3 ; redecorated in 1163

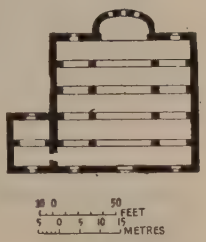
263 Traù : East End (13th century)

264, 265 Gernrode : The 10th century Church (the Choir (*above*) is 12th century)

resting in rebates cut in the thicker stones. This method of roofing is met with in a more decisive form in Syria, in the church at Tafkha, attributed to the fourth or fifth century (266 and 267), where a series of arches is built across the church, and large slabs of stone placed on the walls carried up above the haunches of the arches, forming a flat roof. Fig. 260 is from a photograph showing two of these roofing arches as now existing. In some of the French churches of the early Romanesque period we find this use of heavy transverse arches forming the salient features of a continuous waggon-vault; as at Issoire, where the central nave is vaulted in this way, the aisles, which are roofed with true quadripartite vaults, being carried up two stories so as to rise above the springing of the centre vault and afford an abutment to it (268). St Sernin at Toulouse is vaulted in the same fashion ; as also the nave of the cathedral at Autun (with a pointed vault), where long strips of pilasters rise from the floor to the springing of the main arches of the vault, in a manner foreshadowing the spirit of Gothic architecture, while the piers of the nave arcade are formed of classic-looking fluted pilasters and capitals ; the whole representing the overlapping of the old Roman and the new mediæval methods of design (259). These are rather late examples of the kind, being all of the latter half of the eleventh century.



266. Part Section of Church at Tafkha (4th century ?).

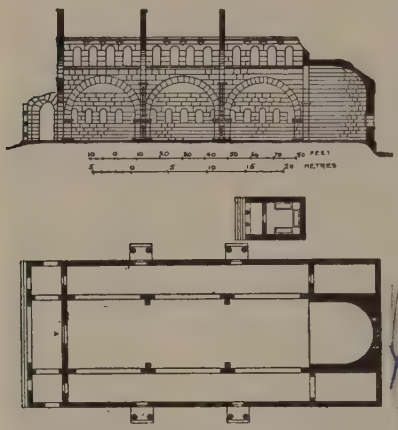


267. Plan of Church at Tafkha.

268. Section of Church at Issoire (early 11th century ?).

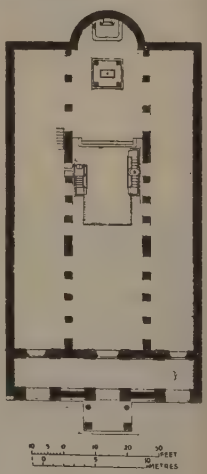
In nearly all cases where this waggon-vault construction of the central roof occurs, the narrower spaces of the side aisles are cross-vaulted; the employment of the waggon-vault in the centre merely arose from the builders being nervous about the undertaking of a cross-vault on so large a scale. The employment of the heavy arch above the main piers indicates a crude idea of attempting to concentrate the strength of the roof above the main points of support in the substructure, but in reality it could have little effect in that sense, as all the other portions of the waggon-vault are exercising a continuous thrust along the whole length of the walls ; and Choisy suggests that the real reason for the introduction of these more solid arches over each of the main piers was to lessen the amount of centering necessary ; the main arches being built on a solidly constructed built-up centering, would then afford supports for the construction of a lighter centering resting on them, for building the intermediate lighter portions of the waggon-vault. This affords a practical reason for what would

otherwise seem a rather illogical proceeding. But even after the cross-vaulting of the centre roof had been successfully undertaken, and adopted as the usual practice in France, Germany, and North Italy, this emphasising of the transverse arch was still maintained as a leading feature in the vaulting, and the form of a Romanesque vault is almost always that of a heavy transverse arch between each bay of the vault as in Fig. 258, the space between being filled up by a quadripartite vault which, in point of design, is independent of the transverse arch.



269. Section and Plan of Church at Roueiha, Syria (6th century ?).

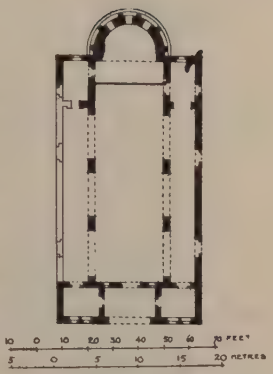
The Romanesque vaulted style found its greatest development in North Italy, in the Rhineland of Germany, in the centre and north of France, and in a sense in England, after the Norman Conquest ; though the Norman churches (as they are habitually called) in England almost all have wooden roofs over the centre avenue of the nave. It was from French Romanesque that the great and complete style of mediæval Gothic was naturally developed. The French Romanesque had within it the capacity, almost the presage, of further development ; whereas the Lombardo-German style, with its hard mechanical detail and piecemeal character of design, had no inherent principle of development, and in Germany merely gave way to a second-rate Gothic, borrowed from France, and spoilt in the borrowing.



270. Plan of S. Maria in Cosmedin, Rome (790).

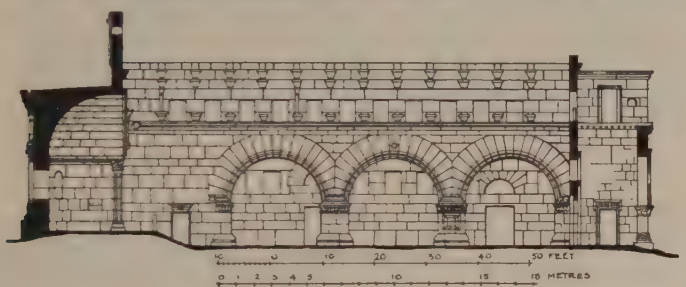
But before we study some of the features of German and French Romanesque, let us take one more look at the Syrian churches ; for among them, some centuries before the development of the style in Europe, were churches of which the style can only be characterised as Romanesque, though their roofs were not vaulted. Look at the plan of the church at Roueiha (269), and compare it with that of S. Maria in Cosmedin (270). Here are the large piers of S. Maria, spaced at equal distances, but no colonnade filling in between ; large bold arches spring from pier to pier, totally different from the close-spaced arcades of the typical Latin church. The details are coarse, but the arcading is in the large bold style of Roman tradition. A similar type of plan is found in the church at Qalb-Louzeh (271 and 272), where arches spring from low rectangular piers with capitals suggesting a confused tradition of the Classic capital,

and the piers under the chancel arch have a striation which looks like a tradition of the Classic fluting. Such buildings, in a different site, might have originated a style, but they were too far removed from the highroad of architectural development; they stand roofless (for their wooden roofs have naturally perished)—isolated efforts from which nothing further can be traced, yet too interesting and significant to be passed over without a glance.



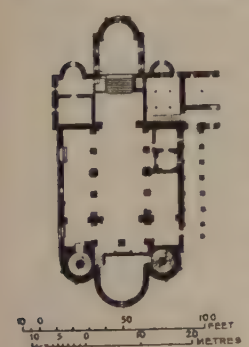
271. Plan of Church, Qalb-Louzeh.

Yet it may be observed that one of the earliest examples of German Romanesque, the church of Gernrode (tenth century) is Romanesque in the same kind of sense as these Syrian churches are Romanesque. The nave is not vaulted, and it shows the simple apse at the east end (that at the west end, shown in the exterior view, is a twelfth-century addition) is in the Latin plan. Yet it must be classed as Romanesque architecture, for the same reason that the two Syrian churches just mentioned must be so classed—the



272. Section of Church, Qalb-Louzeh (6th century ?).

treatment of the nave arcade (265), in bold wide arches springing alternately from a square pier with a moulded capital and a cylindrical column with a quasi-Classic carved capital; an arrangement which is radically distinct in architectural effect from the close continuous colonnade or arcade of the Latin church. The exterior (264) exhibits in their simplest form some of the peculiar features both of German and Lombard Romanesque; the flat wall-arcading on the towers and along the upper part of the aisle wall (where it recalls the similar treatment in S. Apollinare in Classe); the long attenuated strips of buttress on the face of the towers, quite useless constructively, but historically interesting as a distorted descendant of the Classic applied pilaster; and more especially the little wall-arcade under the eaves of the twelfth-century apse, a feature of almost constant occurrence in the apsidal



273. Gernrode: Plan.

terminations of German and Lombard Romanesque churches, the pleasing effect of which quite justifies the predilection of the architects for it ; in this instance it is quite the best point of the exterior architecture. The circular towers at Gernrode, instead of being merely adjacent features, as in the Italian fashion, are an integral part of the building and of the architectural design.

The fine church of St Michael at Hildesheim (262), some half a century or so later than Gernrode, is Romanesque in the same sense, in the bold design of its arcades, by which the nave is divided into nine bays, which are again subdivided by the introduction of a square pier with a moulded abacus at every third point of support, the intermediate arches resting on columns with carved capitals. The roof is still a wooden one, however, and the emphasis given to every third pier is not carried up into the superstructure, the wall being blank above the arcade ; but the plan shows a development at the east end ; in place of the mere apse there is an extended arm constituting a short choir, with the apse at the end. Perhaps the best example of the vaulted German Romanesque church that we can turn to next is the cathedral of Worms (274) mainly of the twelfth century, as this affords, in its plan and exterior design, an interesting comparison with Gernrode. We have the twin circular towers one on each side of the apse, but with a far more finished and symmetrical architectural treatment ; wall-arcading and thin strips of pilasters are still the principal means of what may be called mural expression, but they are arranged on a broad, definite, and consistent design, carried also along the sides of the nave and aisles, so that, though the design is severe and a little monotonous, there is a fine unity of style about it. The twin circular towers are repeated at the west end of the church also. The eastern towers are connected by an arcaded gallery above the level of the nave roof, the arcading running round the towers. This system of wall-arcading, as a means of expression and of binding together the design, as it were, is especially characteristic of German Romanesque, where it is more freely used than in any other mediæval style (though it is also of frequent occurrence in Norman and in complete Gothic), and notice should be taken also of the persistent use of the series of small arches or arched corbels under the eaves and at the various horizontal stages of the design, which merge into a pilaster at regular intervals ; this is a constantly recurring feature both in German and Lombard Romanesque. The church is completely vaulted, on the usual principle in early vaults, before referred to ; one square compartment of the nave vault to two of the aisles. The alternating principle in the design of the piers again recurs at Worms ; the pier under the springing of the nave vault is a compound one, a wide shallow projection or pilaster east and west carrying the capital and impost of the nave arcade, while on the face towards the centre of the church a pilaster with a semicylindrical shaft runs right up to the springing of the vault (274) ; this half-round shaft, long and narrow as it comparatively is (it assumed still slighter proportions in complete Gothic), is the lineal descendant of the Roman unfluted column, altered out of recognition for application to a special purpose of architectural expression ; that is its sole value, for it does not actually *carry* the springing of the vault, it only makes believe to do so for the sake of design, being, in fact

274 Worms Cathedral : Interior (early 12th century)

275 The Nave, Spires (late 12th century ?)

276 The Minster, Bonn (12th century)

277 Worms Cathedral (early 12th to 13th century) (*top*)

278, 279 Views of St. Martin's, Cologne (E. portion early 13th century) (*centre*)

280 Laach Abbey (1093–1156) (*left*)

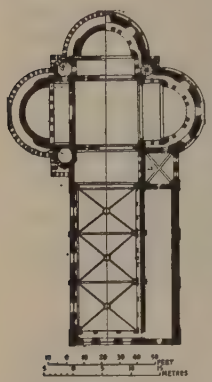
an integral part of the bonded masonry of the pier. The intermediate piers, which have no connection with the vaulting (except on the side of the aisle), are simple squares on plan. The vault was built rather later than the rest of the church, and the transverse arches show a slight point, but in the main this is a typical example of German Romanesque. The plan shows a projecting transept and a choir of about the same proportions as that of Hildesheim.

Among other examples of German Romanesque is the deserted abbey church of Laach (280), on the exterior of which will be recognised the same general character and detail which we have noticed at Worms. The rather awkward form of roof to the centre tower is of interest as affording an early suggestion of the feature which, later, developed into the spire. The plan of Laach recurs rather more to the basilica type, with the small transept and subsidiary apses, though the centre apse is prolonged into a small choir, as at Hildesheim (281). The church is entirely vaulted, but not on the usual Romanesque system of one bay of the nave to two of the aisles ; the vaulting compartments both of nave and aisles are parallelograms with longer and shorter sides, the short side of the nave compartment equalling the long side of the aisle compartment. The alternation of piers is therefore not carried out in this church ; as all the piers have the same relation to the general design, they all have one plan, almost the same as that of the main piers at Worms. An interesting point about the plan of Laach is that it preserves a cloistered atrium at the west end, and has also a western apse. The choir is flanked by two tall square towers, of somewhat the same character as the Italian campaniles, but not with their graceful design of openings increasing in number in the successive stories ; at Laach the window openings are the same in three successive stories, with a somewhat monotonous effect. But the whole church makes a most picturesque and romantic grouping.

281. Plan of Laach Abbey.

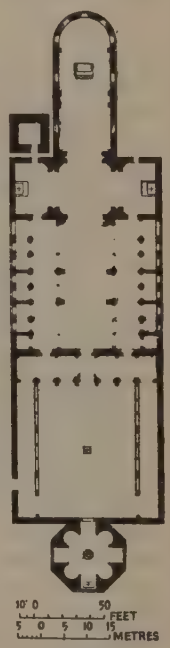
Mayence and Spires are two others of the most important German churches, a good deal altered and restored. Mayence, of the tenth and eleventh centuries, has the favourite round towers of the Germans, the apse with high wall arcades and an elegant arcade with columns standing free, under the eaves, and an octagonal centre lantern with similar arcades ; here also, as in some other German churches, there is a western apse. Spires is a church with a grand plan showing a remarkable degree of monumental solidity ; the arches of the nave arcade (275) are high and narrow, with piers treated on the alternating system, those which take the weight of the vault having large and massive vaulting shafts with square capitals at the springing of the vault, and further bound (in appearance) to the pier by a very bold moulded band halfway up. At Cologne, which was a great centre of architectural enterprise, there were three churches remarkable for their grand and exceptional plans ; S. Maria in Capitolio, S. Martin, and the Church of the Apostles. In each of these the plan expands, towards the east end, into three great apses, opening from the choir and from the two transepts : in the first-mentioned church indeed, it may be said that the

transepts consist entirely of the apses. The church of S. Martin (278, 279) is differentiated from the other two by the erection of a large centre tower or lantern between the three apses. The treatment of the exterior of the apses, with a lower tier of lofty wall arches with small windows in the interspaces, an upper tier of which each alternate bay is pierced with a large window, and then the small arcade beneath the eaves—this treatment carried symmetrically over all of the three great apses, severe as it is in style, has a broad and dignified effect. Two other German churches which are worth special mention are the church at Bonn (276), with two large and broad towers flanking the eastern apse, more important and dignified in character than the usual tall narrow towers or turrets of the early German churches, and having some resemblance to the Italian style of campanile ; and the church at Rosheim, the façade of which, with its raised gabled centre, the slope of the side aisles, the long vertical strips of pilasters up the front, and its general features of effect, is so like the character of Italian Romanesque that it seems to belong rather to Lombardy than to Germany.



282.
Plan of St Martin's, Cologne.

The foregoing examples and descriptions will enable the reader to estimate the general character of the German Romanesque—prim, severe, and rather monotonous in detail, but offering a considerable amount of variety and picturesqueness in the general composition of the buildings, with their grouping of towers, often dominated by a central lantern of octagonal plan. They are mostly poor and hard in effect in their mouldings, and it is especially to be noticed that nearly always the arches of their nave arcades (262 and 274) are destitute either of mouldings or of that setting back of the arches in recessed orders which at an early period, as we shall see, gave so much force and expression to the French Romanesque interiors, and laid the foundation of the elaborate arch-mouldings of the Gothic period. The Germans were content with the flat soffit of the Roman arch, which might perhaps on that account be the more "Romanesque," but was not so suggestive of future development in masonic expression.



283.
Plan of Novara Cathedral (11th cent.).

We turn now to North Italy. In one of the earliest Romanesque churches, Novara, of the eleventh century, we find much the same means of outward mural decoration that we find in the early German examples—the employment of long thin pilasters from ground to eaves, of flat wall-arcading, and of arcaded corbelling under cornice and string-courses. Novara, however, has an unusual and

rather interesting plan (283). The apse has developed into a tolerably long choir ; the main vaulting compartments of the nave, which are square, coincide with three compartments of the aisles, except that there is a narrower compartment in the centre of the nave, between the two square ones ; and the cross walls of the outer aisles are, in fact, internal buttresses. The plan shows an atrium of which the side next the church is vaulted, and an octagonal baptistery, of which the lower portion is possibly Roman work. The building is mainly of brick, but the columns are marble. The vaults have tie-rods at the springing—a treatment frequently adopted in Italy, possibly as a result of a temperamental abhorrence of heavy mass clashing with the light graceful effect of an arcade, and in place of securing sufficient abutment for an arched construction. The transept is only marked internally ; it has no external projection. This tendency to keep the outer wall line unbroken, or as little broken as possible, is part of the legacy of Classic architecture ; the tradition left by the symmetrical parallelogram of the Classic temple.

This Classic tradition made itself felt throughout all the changes in Italian architecture—Romanesque, Gothic, and (of course) Renaissance. It is manifest not only in the general forms of plan, but in the character of the details in the more advanced Italian Romanesque ; there is about them a precision as well as a certain grace and elegance which seems a legacy of the antique spirit. We recognise this quasi-Classic feeling in such a front (285) as S. Zenone, Verona (twelfth century) ; in a certain delicacy and harmony of proportion, rather to be felt than defined, but which is different from the comparatively crude appearance of German Romanesque work. On the other hand, both this and Novara, and many other Italian façades, illustrate the widely different expression given to the exterior treatment of the churches of Italy and Germany. In S. Zenone there is distinct *design*, and the result is pleasing ; but it is to be remarked that here, as well as in such later and more elaborate examples as S. Miniato and Pisa Cathedral, the Italian architects were content to employ, as the sky-line of the façade, merely the sloped lines of the centre pediment and the side aisles ; and where there was a tower, it was no part of the actual façade, but only a separate object standing apart. How different this is from the large compositions of towered and turreted fronts which the Germans gave to their churches, and with which they masked the weak-looking triple section of nave and aisle roofs. Where the German Romanesque architects relied for effect upon bold modelling into mass, the Italians concentrated more on grace of outline and delicacy of detail. The characteristics of the architecture of either country naturally reflects those of the people who built.

S. Zenone may have been intended to be vaulted, every alternate point of support being a large and massive compound pier with a vaulting shaft carried up to the springing of the roof ; but the vault was never carried out. The intermediate supports are rather light columns with carved capitals and a heavy and clumsy-looking abacus ; and the arches which they carry, though not moulded, are in two orders, one recessed within the other, instead of the flat soffit of the German arcades. The crypt is completely vaulted. The twelfth-century church of S. Ambrogio at Milan is one of the most remarkable

buildings of this date. It has a long atrium, apparently earlier than the present church, and the church is probably built on the plan of an earlier one, as it has the small apse of the Latin plan. It has, however, the alternating arrangement of piers—the secondary piers in this case being also compound piers and not mere columns (284) ; and the arches are in two orders of similar section of those of S. Zenone, both principal and intermediate piers being designed with reference to the section of the arches which spring from them. From the capitals of the intermediate piers springs a small half-column against the wall, which carries nothing, but merely dies into the arched corbelling under the string-course below the gallery. This planting of a small column on the cap of the main pier is a device constantly found in French Romanesque and early Gothic ; the plan of the piers resembles that of much early French work ; and this suggests that S. Ambrogio may have been designed under French influence, and that it is to this influence that it owed also its unusually bold quadripartite vault with heavy ribs of square section. It is noticeable, too, that the campaniles which flank the west front form a portion of the main building instead of being detached from it in the more usual Italian manner, though the west front shows the usual sloping lines of the Italian façade.

S. Michele, Pavia (probably twelfth century) has a façade very characteristic of Italian Romanesque feeling, with its wide gable and elegant stepped arcade following the line of the gable (286) ; the doorways with their recessed arches and jambs of several orders are examples of a form of door arch which is essentially Romanesque, but was more richly developed in French and English work. The two groups of long thin shafts going up to the roof line, but supporting nothing, give the idea of the façade being unfinished, as if they were intended to lead up to something that was not carried out ; but the same feature occurs on the exterior of the apse, which is obviously complete ; and we find it again in the more elaborate and obviously quite complete front of the cathedral of Piacenza. The fact seems to have been that there was a feeling that these gabled fronts in one slope were too wide in their proportions for a good effect, and that they must be broken up by vertical lines somehow ; and these groups of shafts were introduced as the only way that occurred to the builders of doing it. It would have done well enough if the shafts had had any kind of appropriate finish or been made to carry something ; but they are merely stopped short off, as if the builders did not know what to do with them. Both S. Zenone and Piacenza furnish examples of the peculiar form of projecting porch which was invented in Italy at this period, and became a favourite feature—a light arch and gable carried by two light columns resting on the backs of animals.

Piacenza offers some special points of interest in the plan, in which the transepts are very much developed, having three aisles and an apse to each transept at the extremities of the centre aisle ; and the arcades of the nave are carried not by compound piers, but by great cylindrical built-up columns somewhat resembling those of the nave of Gloucester Cathedral—a very unusual feature in Italian Romanesque, as they have no resemblance to Classical columns, and are finished merely by a few mouldings with enrichments.

284 Interior of S. Ambrogio, Milan (late 11th or early 12th century) (*top*)

285 Basilica of S. Zeno, Verona (12th century)

286 S. Michele, Pavia (late 11th or early 12th century (*left*)

287 The Certosa, Pavia (1396)

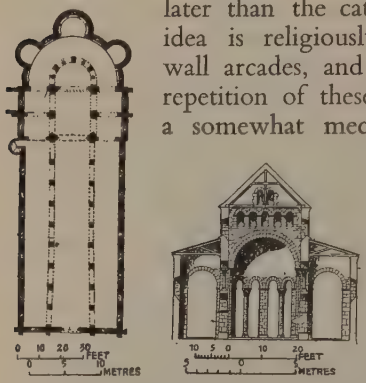
288 Pisa Cathedral and Tower (1006–1103)

Parma Cathedral has more variety of outline and grouping than is usual in the Italian churches of the period, though the exterior details are pure Romanesque ; in the western façade the usual flat wall-arcading is stopped a little way from each angle, leaving a wide angle pier of plain walling, which has a more solid and monumental effect than the more usual arrangement of a thin pilaster at the extreme edge of the façade. As a general rule this want of mass at the angle of the façade is one of the weak points of the Italian Romanesque. A frequent feature in the façades—it is seen in San Zenone (285), Piacenza, Cremona, and elsewhere—is the insertion of a large wheel window over the centre entrance, with tracery arranged like the spokes of a wheel, frequently ending in half-circles which cross each other so as to form a pointed arch at the extremity of each light.

The Certosa at Pavia (287) and the church at Chiaravalle (299) are noteworthy as representing a special type of church with the transepts prominently developed and with a very effective octagonal form of central tower in stages, found only in Italy, and which Fergusson thought (not without reason) was the kind of central feature intended by the original architect (Arnolfo di Lapo) of the Florence Cathedral, which was superseded by Brunelleschi's octagonal dome. The Certosa, founded in 1396, comes well into the Gothic period in point of date ; but, as in some other instances in Italy, it remains essentially Romanesque in everything but the finial lanterns to the turrets. Later, as we shall see, it had a Renaissance façade added, but the Gothic influence passed it over ; it went straight from Romanesque to Renaissance.

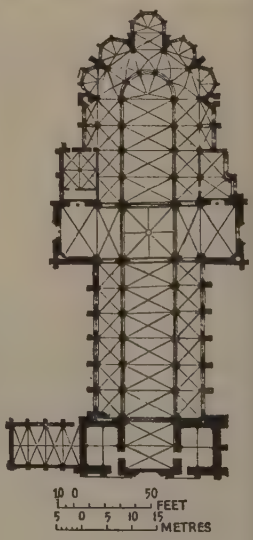
Among Italian buildings of this period which cannot be quite classed architecturally with the average Romanesque types is S. Miniato at Florence (see 242 *ante*), which is, in fact, south of the range of Lombard influence, and though it may be classed as Romanesque, is really more like a basilica church carried out with a greatly increased refinement of design and detail, both externally and internally. Its nave colonnade, indeed, is almost Classic in feeling ; and the whole building is in its grace and finish of detail a strange contrast to the character of the buildings which were being carried out at the same time only a hundred miles or so to the north of it—the difference between the Tuscan culture and the semi-Teutonised spirit of Lombardy. The cathedrals of Siena and Orvieto (298), with their classic-looking columns and timber roofs, represent the same type, varied by a special use of material in the banded masonry. The cathedral of Pisa, again (288), which must be called as Romanesque, and which repeats the usual proportions and outline of the Lombard façades, almost represents, with Lucca, a special local architectural style, with its crowd of arcades over the front, not flat like the Lombard arcading, but deeply recessed and with a forest of colonnettes standing free in front of the dark shadow behind them. It is some half a century later than S. Miniato, and internally shows, like the latter, a wooden roof and an arcade on Classic-looking columns, but not so refined in design as the S. Miniato arcade. The transepts in the plan are developed to a great length and, as at Parma and some other churches, have apses at their termination. It must be admitted that, graceful and fanciful as this mass of light arcading is, it has rather a weak appearance,

and would on the whole be the better for a little more solid wall introduced to steady it. Behind the cathedral is the celebrated tower, commenced a century later than the cathedral, but in which the same architectural idea is religiously carried out; a high ground-story with wall arcades, and a series of stories with free arcades. The repetition of these six identical stories, all of equal height, is a somewhat mechanical piece of design. The legend still repeated in popular books, that the leaning position of the tower arose from a failure of the foundations, ought to be considered as exploded. At Bologna, some sixty miles off, are two leaning towers; half a century later we find another at Pisa. Though evidence has been found that an attempt was made during course of erection to flatten out the beds of the stonework, it is probable that this was because the leaning angle at first attempted was too daring to be safe and progress beyond this stage was curtailed in ambition. However, the real solution to the fact of the Leaning Tower of Pisa remains a mystery.



289. Plan and Section of Church at Vignory (1050).

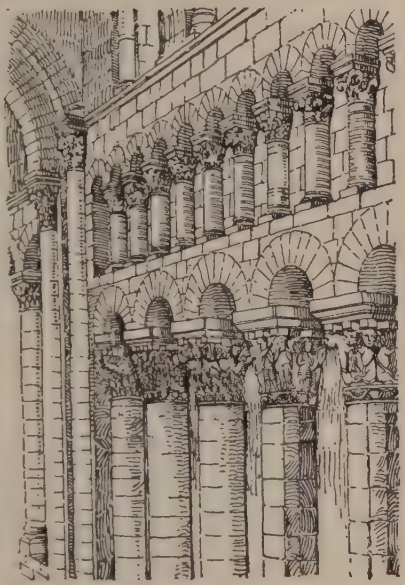
We have already referred, in the last chapter, to the group of churches in the South of France, of which St Front at Perigueux is the most celebrated, and which belong essentially to the Byzantine type of architecture. We have now to trace out briefly the rise and development in France of the Romanesque vaulted church of the long type—the most important of all, since out of it developed the great mediæval style.



290. Bayeux (*chevet* 1157).

Among the early churches of France is one (289) at Vignory (Haute-Marne) which is to French Romanesque somewhat the same as Gernrode is to German Romanesque. As at Gernrode, we have the heavy arcade (in this case with square piers throughout, instead of the alternation of pier and column); the "triforium" arcade over it—two arches for one of the main arcade, alternately pier and column (the column coming above the keystone of the ground-floor arch); the timber roof, and no feature connecting the roof design with the sub-structure. As at Gernrode, it is Romanesque without the vaulting; the character of the architecture, in spite of the wooden roof, is quite different from that of the Latin basilica. But there is one important feature in the plan, the treatment of the apsidal east end. Instead of an apse forming the termination of the centre avenue, and smaller apses terminating the aisles, the apse is the whole width of the church, and three smaller apses radiate

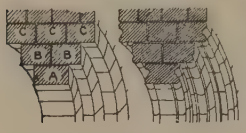
out of its circumference. This is one of the earliest forms of the type of east-end plan, with radiating chapels, which was to become one of the most picturesque and characteristic features of French Gothic. The plan of Bayeux (290) shows the idea developed into a series of five chapels; this arrangement of radiating chapels is called in French a *chevet*. The church of Saint Genou (Indre) is another early example of the round-arcaded church of a ponderous type of architecture; in this case the nave arcade (291) is carried by built cylindrical columns, with capitals of a rudely classic outline with varied and in some cases rather grotesque carving, and narrow arches with flat soffits; the proportions and spacing of the arcade are more Latin than Romanesque, but the columns built up in courses have the Romanesque touch; in the Latin arcade the columns are always monoliths. But in both these churches the chancel arches are in two orders, instead of the flat soffit at Gernrode; and at St Genou already the pier carrying this is planned to coincide with the section of the arch; two long shafts, in front and at the angle of the pier, each with its separate capital (see illustration), taking respectively the two orders of the arch. The style and feeling of this is already Gothic in character, and different from anything to be found in a basilica of the Latin type. It heralds a new spirit in building.



291. Arcade at St Genou (11th cent.).

A word, before we go further, as to the origin and meaning of this peculiarly mediæval system of building arches in successive rings of masonry, each wider than the one below it. The Romans, who built arches on a large scale in great blocks the full thickness of the arch, leaving the soffit or under-side of the arch a plain unbroken surface, had no doubt the mechanical means at their command for transporting and handling such large masses. At the commencement and perhaps throughout the greater part of the period known as the Middle Ages, engineering science and mechanical resources were probably in a very crude state, and it became a matter of consequence to limit the size of the stones to be handled. As far as ordinary walling was concerned this was merely a matter of choice; but arches presented a difficulty. To have erected them in two or three parallel rings on the same level would have been a weak and unsatisfactory construction, leaving parallel face joints through the whole soffit, liable to open at any slight settlement or disturbance of the piers; moreover, it would have required either a large timber centering the full width of the arch, or the separate building of each ring with the centering shifted for the

purpose. For in Western arched architecture the centering for erecting the arch is always an important consideration ; the system of building arches and domes without centering (unless for the filling at the top), by keeping the beds of the voussoirs as near the horizontal as may be, is essentially Oriental; in Western architecture the joints of the voussoirs are always at right angles to the curve of the arch, that is to say a continuation of its radius. Such an arch makes better building when finished, but it cannot be erected without temporary centering. But if an arch is built of the section shown in Fig. 292, the ring A can first be built on a light centering, it then furnishes a centering on which to erect the second rings B, B, and these again afford a centering for the final rings C, C, C. The next step was to work mouldings on the angles of the stones, as shown on the right-hand sketch. Except in the decorative arches of doorways, Romanesque building seldom or never went beyond three orders in an arch, and except in the latest period was more generally confined to two. But even these two had an important effect on architectural development. At a very early stage the French builders perceived that with a single cylindrical or square pier and a square capital, the arch in two orders left a vacant space on the capital (as at A, 293), which was doing no work and that there was a want of logical relation between the arch and the pier. Hence the breaking up of the plan of the pier into different faces and half-columns (as at B), answering to the orders of the arch, and with separate caps, or a special projection of the cap, to take each member of the arch. The manner in which the Norman builders sometimes experimented with the designs of their piers is curiously illustrated at Rochester, where the plans of the nave piers are all different, running from east to west. The capital of the western pier shows the attempt to accommodate it, and the section of the arch, which it carries to the unusual plan of the pier (294).



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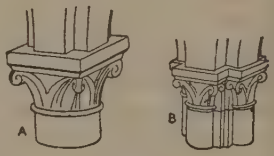

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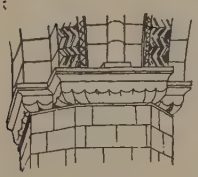
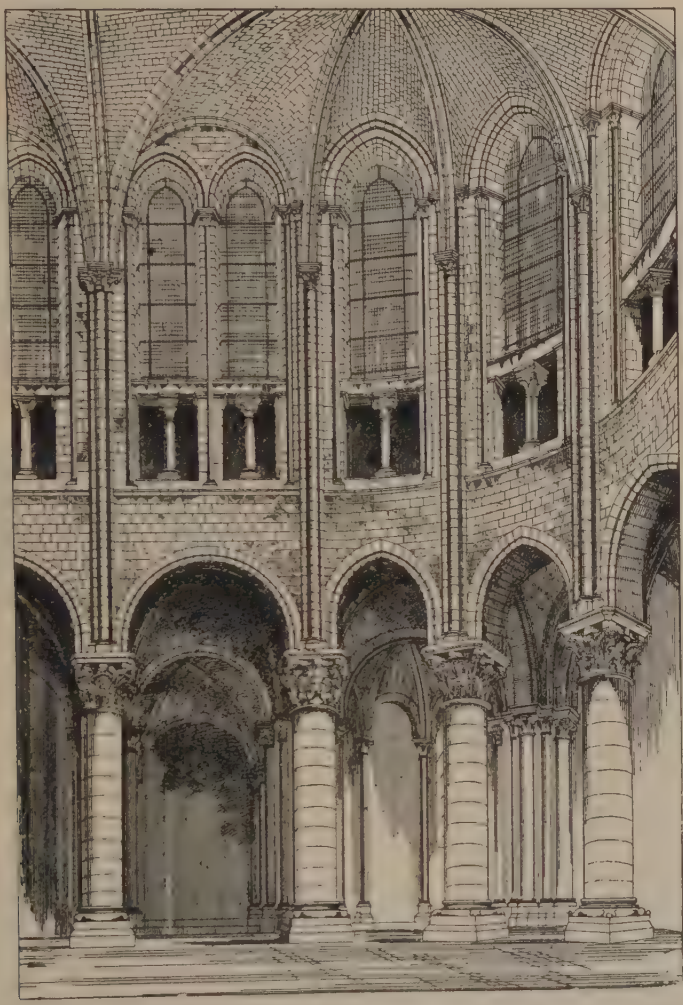


294. Capital of Norman Nave Pier, Rochester (early 12th cent.).

It was this dividing up of the members of pier and arch, so as to give each portion of the masonry its appropriate expression in a design carried out with stones of limited size, that was to become one of the most formative influences in the development of Gothic architecture. In the full period of Gothic it was carried out, as we shall see, with a more detailed elaboration of parts, but the foundation of it was laid in the Romanesque period ; and it is this compound pier and recessed arch which at once differentiates Romanesque from Classic Roman and from Latin architecture. It represents a new spirit in building, with an inherent power of further development. And it was the French Romanesque architects who most decisively seized on this new form of treatment in masonic design, and perceived its capability of expression and of

expansion, both in the horizontal and the vertical direction. Even before cross-vaulting was carried out, it was perceived that if the springing of a transverse arch required a cap to start from, the columnar member which

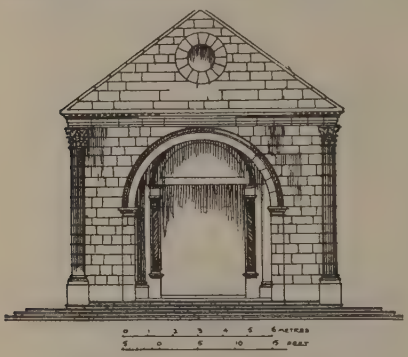


295. Interior of the Choir, St Germain des Prés Paris (*c.* 1160).
Drawn by R. J. Johnson.

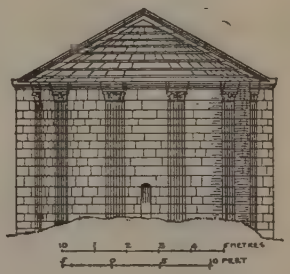
usually carried a cap could be lengthened for the occasion ; could be carried up from the floor as a long thin shaft, so as to connect the arched construction with the ground plan. St Genou, before referred to, shows the transition almost in the process of becoming. Here (see again 291) is the reminiscence of the single Classic column in the main arcade, with its arches of flat soffit,

and there is the double-order arch of the transverse arch, with its long shafts rising from the floor. In that corner of the building Gothic architecture has already commenced. In St Germain de Prés, Paris (295), we see the process carried a step further, where the use of the pointed arch has already commenced, but we have still the reminiscence of the Classic column and capital and the arch with the flat soffit ; and in the ground-floor arcade the pointed arch has evidently been introduced with the object of getting the apex of the narrower openings to range with that of the wider round arches.

It is curious that, in spite of this early foreshadowing of principles of building that are essentially Gothic, in certain details the reminiscence of Classic forms seems to have retained its influence more in France than in Lombardy or Germany. This is seen chiefly in reference to external forms, and more in the south than in the north of France. The south of France, indeed, is a region of mixed influences and architectural experiments, often of much interest, but

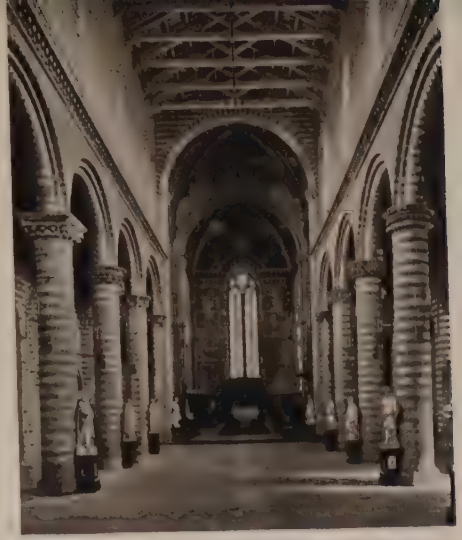


296. Porch, Notre Dame des Doms, Avignon (*c.* 1150).



297. Apse, St Jean de Mousthier (12th century).

leading to no definite result in architectural history. The church of Notre Dame des Doms at Avignon, probably founded in the ninth century, has a later round-arched porch (296) with flanking columns of Corinthian type, carrying a horizontal cornice running above the arch, which is so Classical in appearance that it might almost pass for Roman work, except that the arch is not a complete semicircle, and is wider and lower in proportion than a Roman arch would have been. But in rather later work, in the south especially, we constantly find engaged columns and pilasters of Classic type used as exterior buttresses, especially at the angles of a semi-octagon apse ; a kind of feature occurring even as late as the twelfth century. Thus at St Jean de Mousthier, at Arles (297), the apse has fluted pilasters with caps coinciding with the eaves line of the roof ; at Thor (Vaucluse), a small single-aisle church attributed to the early twelfth century, the angles of the apse are treated with fluted pilasters in two faces, as if bent round the angle, in this case carrying wall-arcades, instead of going up to the eaves ; and in the church of Notre Dame du Port, Clermont-Ferrand (300), the five sub-apses which open from the main apse have each two engaged Classical columns equally spaced on the exterior walls, and two square



298 Orvieto Cathedral (1290) (*top eft*)

299 Church of Chiaravalle (1221) (*above*)

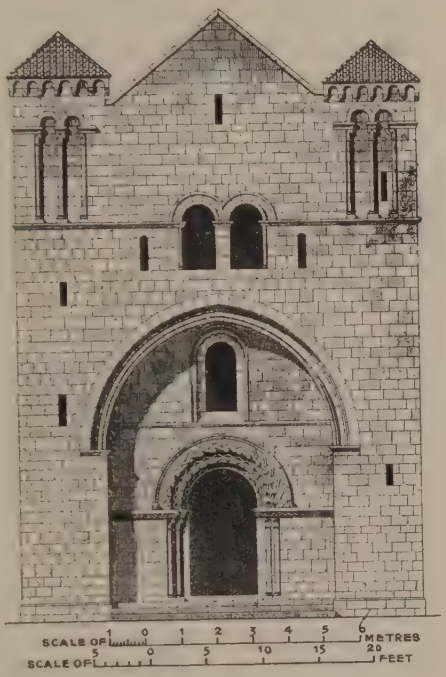
300 Chevet, Notre Dame du Port, Clermont-Ferrand (late 11th century ?) (*left*)

301 West Doorway, St. Trophime, Arles (12th century)

302 The Cloister, St. Trophime, Arles (early 12th century)

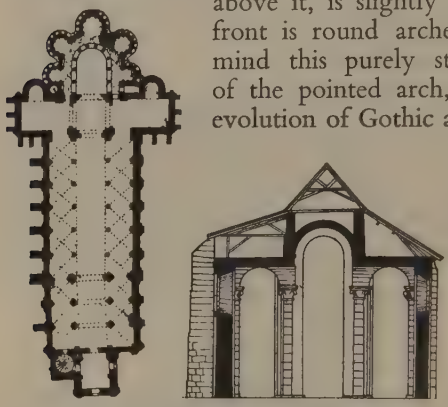
buttresses with a single set-off at the top, at the junction with the wall of the main apse ; a most curious instance of features of the Classic past and the Gothic future side by side in the same building and as part of the same erection. Of these Classic buttress-columns there are many examples among the southern churches of the early Romanesque period ; there is no attempt, in general, to work them logically into the design ; they are simply put on where it was felt that something was wanted, and this was a form made ready to hand. Its use may be partly explained by the supposition that at this date there may have been in France many remains of original Roman work which have since disappeared, but which were then constantly before the eyes of the Romanesque builders.

In the southern French churches of the long type of plan, the attempt to make a monumental vaulted roof took the form, in not a few instances, of a continuous tunnel-like waggon-vault for the central avenue, with the aisle vaults carried up very high to afford an abutment to the centre vault. The church of St Nazaire, at Carcassonne (eleventh century), is one of the crudest examples of this kind ; there is a pointed waggon-vault to the nave, and very high aisles with circular waggon-vaults, the space above these being packed up with masonry to a continuous slope on which roofing slabs are placed, so that the introduction of a wooden roof as a covering is entirely avoided, and the whole is a monumental construction. And it should be especially remarked here that the introduction of the pointed arch form over the centre is solely in order to follow more closely the intended line of the roof, and leave less weight over the centre of the vault, where the ridge of the roof comes ; the section makes this perfectly obvious. This is only one example out of many of the fact that during the period when the Gothic style was in the course of formation out of the Romanesque, the pointed arch is *never* introduced except for reasons of structural advantage and convenience. We shall find other reasons for the structural convenience of the pointed arch when we come to consider the development of Gothic vaulting, when its utility and indeed necessity in the development of this form of building became so obvious that, once recognised, it was never abandoned, and after that no doubt the pointed arch came, by



303. Façade of Church at Pontorson (12th century).

force of habit, to be regarded as the most beautiful and desirable form ; but it was nowhere so regarded in the first instance (except from exotic influences), or introduced from any æsthetic motive. Over and over again we find examples of churches in which some of the larger arches are pointed for structural reasons (a large round arch with considerable weight over it is always in some danger of sinking at the crown), but in which all the smaller openings and decorative arches are round. We see this in the great Transitional abbey churches of Furness and Fountains, in England, where the large arcades of the nave are pointed, and all the window openings and wall arcades are round arched ; and there is a curious and significant example in the façade of the early church of Pontorson (303), in the north-east of France, where one large arch over the recessed porch of the church, with a mass of wall above it, is slightly pointed, and every other opening in front is round arched. And unless the reader bears in mind this purely structural origin of the introduction of the pointed arch, he will not rightly understand the evolution of Gothic architecture.



304. Plan and Section of Church at St Savin. No Scale. (11th century).

In the section of the church at Issoire (see 268 *ante*) the solid roofing over waggon-vaults, on the same principle as that at Carcassonne, is obtained with a round-arched central vault and a half-round waggon-vault over the upper story of the aisle (the lower story is cross-vaulted) abutting against the lower part of the central vault, the sloping roof line being kept close down on the extrados of the vault. The east end plan shows again the system of subsidiary apses opening out of the main apse. Here, as at Clermont-Ferrand, external columns and buttresses are used simultaneously, with the difference that at Issoire they are grouped so that the two easternmost apses have columns and the two others plain buttresses with one set-off under the eaves. There seems to be some sentiment of design in this : the idea of making a more decorative treatment as we come eastward. The remarkable church of St Trophime, at Arles (early twelfth century), is another of the examples with a pointed waggon-vault over the centre and a round waggon-vault over the aisles ; the plan in this case goes back to the Latin church form, with a narrow transept and a simple apse the width of the central avenue. In the church of St Savin (eleventh century), we find a curious mixture of motives in the plan (304); the narrow transept with its two small eastern apses belongs to the Latin plan, the large central apse with its five chapels to the new French plan. And at St Savin we have the arrangement of a round waggon-vault to the centre avenue and a lofty cross-vault to the side aisles ; but here this vaulting does not carry a solid roof ; a wooden roof covers the whole, high-pitched over the centre and

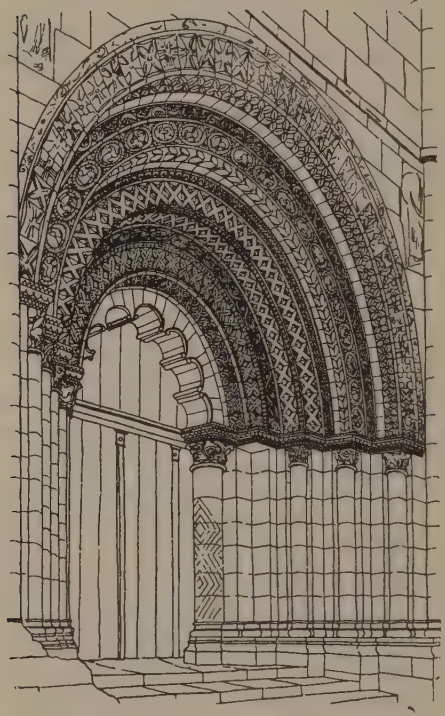
low-pitched over the aisles, the centre roof resting on walls carried up considerably above the spring of the waggon-vault, obviously with the view of weighting its abutment. The builders were timid about this centre vault, for they kept the centre span narrow, the three avenues of the church being about the same width. Among the waggon-vaulted churches of this class is the great five-aisled church of St Sernin (or more correctly St Saturnin) at Toulouse (314), which has the completely developed Romanesque plan with a wide aisled transept and an apse with chapels opening out of it. Here, as at Issoire, the lower story of the aisle is cross-vaulted, and the upper story is a waggon-vault of quadrant section, forming an abutment to the central vault. The exterior roof-line is interrupted so as to form a break between the line of the central and the aisle roof, which has a far better effect than the unbroken slope of roof over nave and aisles usually found in these solid-roofed Romanesque churches.

The grand and effective centre campanile of St Sernin, which was probably an afterthought and not contemplated when the plan was laid out (for the crossing-piers had to be thickened to carry it), serves as a reminder that in the southern French Romanesque a centre erection of some kind over the crossing was usually the salient feature. The western towers were a northern feature; sometimes accompanied by a centre tower, sometimes without that feature.

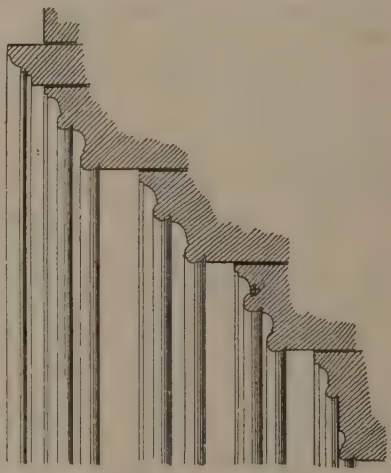
The great defect, in an architectural sense, of the waggon-vault system was the want of adequate lighting in the upper portion of the nave, with the result that the interior has a gloomy, cavernous appearance. The northern employment of cross-vaulting for the central nave, with the consequent means of securing, even during the Romanesque period, a direct light from a tolerably large clearstory window, was one of the great advantages of the cross-vault system, if indeed it was not a main motive for its adoption in the first instance. Apart from this, there is a great deal to be said for the monumental completeness of these waggon-vaulted churches with a solid masonry roof. It, at all events, avoided the perishable element of the timber roof; and it might have been further developed into a separate style of building with grand effect, if a little ingenuity had been exercised in getting lights into the springing of the vault. But the cross-vault and clearstory killed the waggon-vault; and with the cross-vault the timber roof became a practical necessity, not as the roof of the church, but as a protection to the upper surface of the vault, which left a ridge-and-furrow surface not only unsightly in appearance (the cross-vault is essentially a construction for *internal* effect), but very difficult to keep weatherproof.

Among the cloisters in connection with these southern churches are examples of a very effective type of architectural design, consisting of groups of small arches springing from coupled shafts with capitals partly Classic, partly Byzantine in style, supporting a heavy abacus which crosses both capitals and forms the impost of the arch. At Montmajour three such arches in each bay are grouped under a segmental relieving arch, with a wide, flat buttress between them. The cloister of St Trophime at Arles (302) forms a more ornate example with a most curious mingling of styles, the carved capitals on the shafts being a mingling of Byzantine and Classic feeling, while the wall shafts

at the ends of each bay, which correspond to the cylindrical shafts in the centre, are rude reproductions of Classical fluted pilasters, and the projecting buttress between each bay takes the form of a square fluted pier with a carved capital, which, however, supports nothing and finishes off square at the top. There could hardly be a more significant example of mediæval architecture in the making. All these southern French cloisters are roofed with a continuous round waggon-vault, with transverse ribs at each bay, the value of which, however, is æsthetic rather than structural. Among the important features of the southern churches are the portals, which are not only richly decorated with carving, but at this early period,



305. West Doorway, Chalais (12th century).

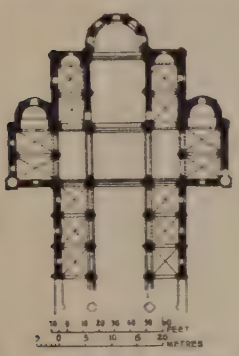


306. Section of Doorway, St Gilles, showing Construction of Doorway in Successive Moulded Arch-rings.

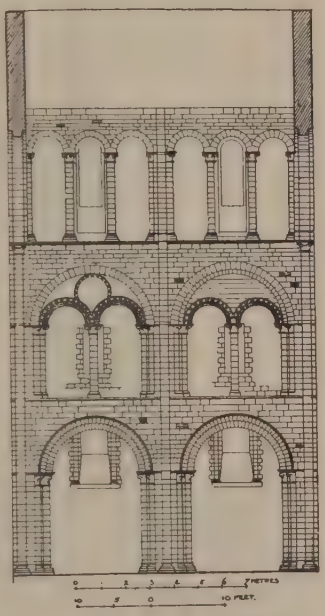
when the main structural arcades of a church were still showing only two arch rings with mouldings (if any) of the simplest form, have already assumed a depth of reveal and a multiplicity of recessed moulded arch rings which represent, in advance, one of the main characteristics of complete Gothic architecture. The portals of Chalais (305) and of St Trophime at Arles (301) are two of the most remarkable examples. The section of the arch of one of the doorways at St Gilles, of the same period (306), shows the manner in which these recessed door-arches are built up in successive rings of masonry. There are also occasional towers to be met with—experimental towers, as one may call them ; one at Puisalicon, which is almost on the model of an Italian Romanesque campanile ; a circular one at Uzés, divided into stages of lessening height as they go up, seeming like the early Italian circular campanile

treated in a more architectural manner. The whole district is a region of architectural reminiscence and experiment, full of interest, yet leading to no permanent result; the more logical architectural development of the North obliterated the bold and picturesque experiments of the South.

Turning now to the real Romanesque development, which was to be the parent of Gothic, we come on our way northward on one curious experiment in the formation of a vaulted roof without the disadvantages in structure and lighting of the waggon-vault. This is at Tournus, where, in the centre avenue of the nave, we find an arcade supported on built-up cylindrical columns, with no capital but a simple moulding; a transverse arch springing from a wall-shaft rising from the cap of the column, with a horizontal moulding over it defining the triangular spandrels, from which springs, in each bay a round-arched waggon-vault at right angles to the axis of the nave. By this bold experiment the difficulty both of lighting and of abutment for the vault was got over; for the weight of the vault was really concentrated on the transverse arches and thence on to the main wall-piers between the bays, whereas with the longitudinal waggon-vault the transverse arches were little more than a structural pretence. But the effect, in the perspective view of the nave, of these successive cross arches, is certainly not good; it contradicts what ought to be the line of vista leading the eye along the building; and we can hardly be surprised that the experiment, clever as it was, had no general adoption. The reader should notice the incident of the small vaulting shaft springing off the cap of the pier, as this is an early instance of what became a frequent feature in French architecture throughout a great part of the complete Gothic period. In England it is unusual, the vaulting shaft being generally either carried up from the floor or seated on a special corbel of its own; but in French work it is a common occurrence for the vaulting shaft to spring from a base seated on the capital of the main pier (see 295 *ante*). On the whole this practice is one of the weaker points of French Gothic, as it interferes with that continuity of vertical line which is the special note of Gothic architecture.

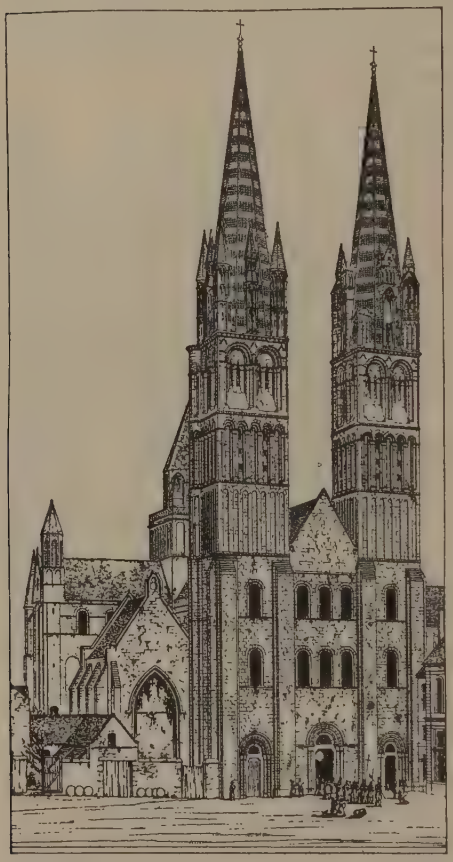


307. Part of Plan of Cérisy-la-Forêt (1030–1042).

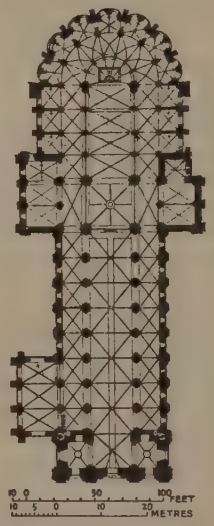


308. Two Bays of Nave, Cérisy-la-Forêt.

It is in Normandy that we find Romanesque architecture showing the most decisive appearance, in the internal design especially, of a consistent and well-proportioned architectural style ; the compound piers and the vaulting shafts well designed in a systematic manner, the different stories and the openings in them showing a fine and spacious grouping and symmetry. One of the earliest buildings of this architectural quality was the ruined abbey church of Jumièges, a grand and solidly built piece of masonry design. It is rather curious that while these Norman churches are the furthest of all three-aisled churches, up to this date, from the characteristics of Latin church architecture, the most consistent development of the Romanesque style of building, their plans show more affinity with the Latin plan than most of the southern French churches of the same period. In the church of Cérisy-la-Forêt, for instance (eleventh century), though there is a choir equal in length to two bays of the nave, with an apse added (307), the apse is only the width of the centre avenue, and the transept is a narrow one with a small eastern apse on each side. But the treatment of the nave (308), with its one bold arch in the ground story, its " triforium " arcade of coupled arches under a large relieving arch, and its triple arcade in the clearstory, is a fine piece of broad well-proportioned architectural design. (It

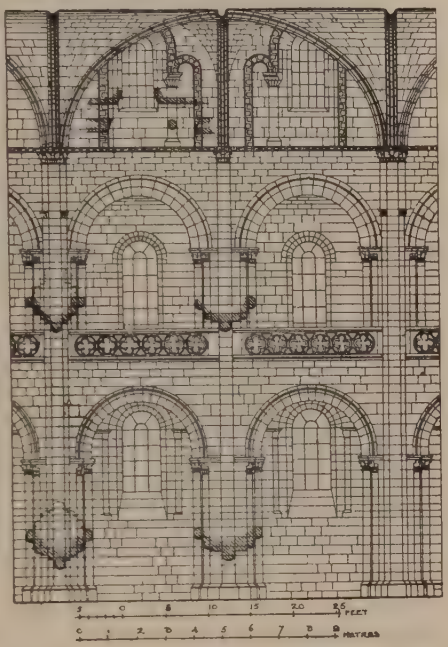


309. West End, St Etienne, Caen (*c.* 1066). (Spires late 12th century).

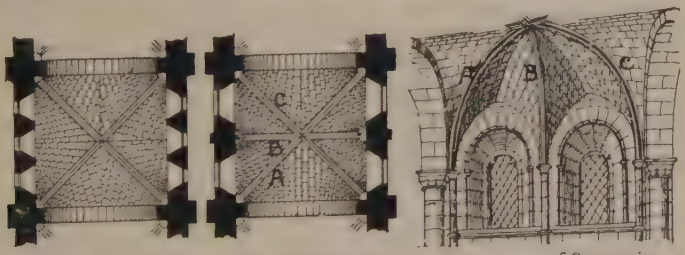


310. Plan of St. Etienne, Caen. (Nave *c.* 1066 ; Choir and Apse 12th century).

might be as well to call attention at this point to the term " triforium," which, originally used to describe the triple arcade in the clearstory, was transferred by nineteenth-century ecclesiologists to the story below.) We come to the full development of the Norman Romanesque in St Etienne (otherwise called the Abbaye aux Hommes) at Caen 309, 310, and 311), commenced just after the Conquest; the original east end of which (rebuilt in the Gothic period) was again a close approximation to the Latin east end plan. Here at last the problem of vaulting the nave was accomplished, but the builders were afraid to face it with the usual quadripartite vault with its wide diagonal arches, so nearly flat at the crown. The plan of the vaulting follows the frequent arrangement, before referred to, of one square compartment in the centre avenue to two of the side aisles, the diagonal ribs springing over every alternate pier; but an intermediate transverse rib was introduced springing from the intermediate vaulting shaft, which acts as an additional support to the crown of the vault, thus rendering the vaulting " sexpartite," each compartment being divided, on plan, into six triangular spaces instead of four. The diagram, Fig. 312, will, it is hoped, make this clear. The lines made by the vaulting are somewhat



311. Two Bays of Nave, St Etienne, Caen (*c.* 1066).



Plan of Quadripartite Vault. Plan of Sexpartite Vault. Appearance of Sexpartite Vault.

312.

confused by this, and not by any means so satisfactory to the eye as those of the quadripartite vault. Possibly it was some perception of this which induced the builders of the Abbaye aux Dames (La Trinité), some thirty years later, to

introduce the intermediate rib without any arched vaulting surface springing from it (311), but only a thin spandrel wall, as a kind of buttress, at right angles to the axis of the vault. Any one comparing the two vaults might suppose that this rib with the spandrel wall was a first attempt towards a sexpartite vault, developed into a vaulting surface at St Etienne ; but the dates are known, and the reverse is the case. In the abbey church of Lessay, the vault of which at all events is later than the two Caen churches, the sexpartite arrangement is abandoned, and there is a simple quadripartite vault over each compartment of the nave.

Architecturally, the interior design of St Etienne is very inferior to that of Cérisy ; the triforium has a large gaping arch wider than the main arch below, and the design of the clearstory windows is awkward. That of La Trinité, with its loftier nave arcade and the low continuous wall arcade of the triforium, forming a kind of decorative band, is much more satisfactory. The design would have been more complete and logical had the piers been treated on an alternating system, large and small—the extension of the centre vaulting compartment over two bays of the arcade almost implies such an alternating treatment, as even with the sexpartite vault the principal load of the vaulting comes on the alternate piers. The west front of St Etienne shows in its full development the design of the façade with two twin western towers ; the method of treating the front which became almost the universal and typical French method in the churches of the Gothic period, and was followed in the English cathedrals of York, Canterbury, and Durham. No system produces so dignified a western façade to a great church, and it has the special advantage that it gets rid of the weak line of the sloping ends of the aisle roofs, which are masked by the towers.

English architecture, after the Conquest, becomes Norman, and probably a good deal of Norman building was done in England before that date. M. Ruprich-Robert, in his work on Norman architecture, mentions a record of the founder of an English abbey in the seventh century having sent over to France for masons " to build in the Roman manner with stones." It is probable that buildings in England in the Saxon period were mostly of timber. The typical plan of the later stone-built Saxon church seems to have been a simple single-aisle nave, with a small square-ended chancel, the square end being preferred because it was easier to build than a circular apse ; and this practical motive probably founded the tradition of the square east end in English churches. During the time when all church building in England was Norman, the apse form prevailed ; when the country had become to some extent de-Normanised, there was a reversion to the traditional form. The architectural treatment in such remaining stone examples as Earls Barton and Bradford-on-Avon (315), gives the idea that it was a rude attempt to imitate the suggestions afforded by Roman remains in Britain, with a certain character of its own derived from the method of strengthening the angles of the walls by " long and short work "—alternate upright and long stones bonded into the rubble

313 Interior, La Trinité, Caen, showing Triangular Spandrel Wall substituted for the sexpartite Vault (late 11th century)

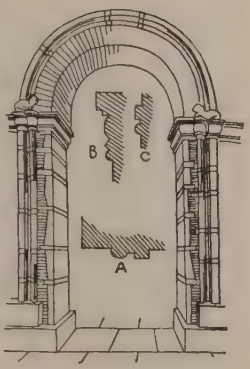
314 St Sernin, Toulouse (1060–90)

315 Saxon Church, Bradford-on-Avon (8th century)

316 Durham from the North-West (centre tower 15th century)

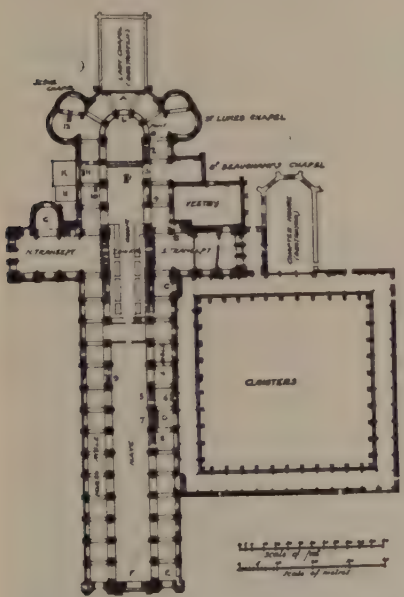
317 Interior of Gloucester Nave, showing Norman Arcade with later vaulting over it, and Perpendicular West Windows

walling. There is a Saxon doorway at St Benet's, Cambridge (318), which looks very like a rude attempt to imitate Roman work. There is one feature in Saxon remains, the baluster found in two or three instances in the centre of a two-light opening, which deserves mention because, though probably an attempt to copy a Classic column, it is unlike any other architectural feature in the world.



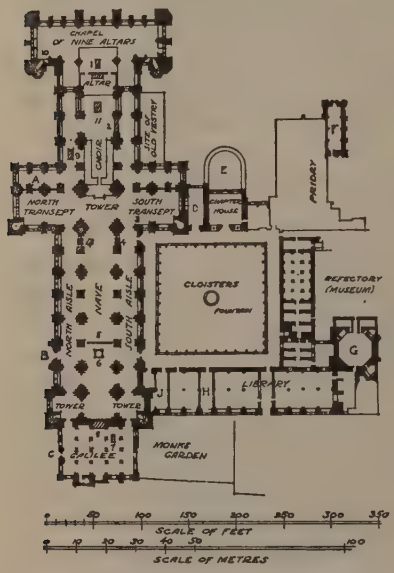
318. Saxon Doorway, St Benet's, Cambridge.
A. Plan of Jamb.
B. Section of Capital.
C. Section of Arch-Moulding.

Although after the Conquest the English churches were founded by the Norman conquerors or the Norman bishops appointed by them, local influences and probably the employment to a great extent of native masons soon availed to give them a distinctive character, different from that of the churches built on Norman soil. About the early capitals and other details in Anglo-Norman work there is a crude clumsiness of design, as in the capital formed with heavy scallops, which are fudged down into the necking of the circular or semicircular column anyhow. Any reminiscence of the Classic form of carved capital seems to have disappeared; it failed to cross the Channel. The rather barbaric zigzag ornament, which occurs occasionally in French work, is repeated in Anglo-Norman work; the interior of Durham is heavily ornamented with it; the doorway at Lincoln (partly restored), Fig. 323, shows its effect. A more important characteristic of the English churches, which affects their whole architectural disposition, is the much greater length of the plan. At Norwich (324), for instance, where the plan (319), with its apsidal termination, remains as at first set out, the total internal length is nearly six times the width (leaving the transepts out of consideration); at St Etienne, Caen, in the original Romanesque plan, the total internal length was only rather more than three times the width. This length is an important element in the fine interior perspective of an English cathedral. But the most important architectural feature of all those which are peculiarly English is the large central tower over the crossing; not the mere lantern of the southern French Romanesque, but a great tower which,



319. Plan of Norwich Cathedral (*c.* 1100; cloister 14th century).

as at Tewkesbury and Winchester, dominates the whole design. The Normans set the example of the twin western towers, partially followed in England, but neither in Romanesque nor in Gothic times did the French architects, as a rule, emphasise the crossing by a tower ; in the complete Gothic period, indeed, they carried the vault and the crossing arches to such a height that a tower could not safely have been raised upon them. The more moderate height of the English churches facilitated the erection of the central tower, while their greater length seemed architecturally to demand it, as a contrast to the long horizontal line of the nave. The adoption of this feature by the Norman builders in England may have arisen from a custom of having a centre tower in the early Saxon cathedrals, so that it became an insular tradition. Many of the original Norman towers have disappeared ; but the centre towers of Canterbury and York, and others of the Gothic period, stand on Norman piers and replace Norman towers that have fallen or been pulled down.



320. Plan of Durham Cathedral (1093–1242).

At Durham, one of the earliest and certainly the grandest of the Anglo-Norman cathedrals (316 and 321), we have both the French and English tower features—the two western towers and the great central tower, in their united effect on a great scale. It is true that the upper portions of the towers were completed in the Gothic period, but they were an essential part of the Norman design. Durham is interesting too as showing the earliest completely vaulted church in England, the nave dating between 1128 and 1133. The arcade of the nave is on the alternating system, compound piers alternating with heavy cylindrical columns (321). The vault design was made to respond to this by designing it with a heavy transverse arch over the main piers, but none over the intermediate ones ; between the transverse arches are *two* compartments of quadripartite vaulting, instead of making the whole space between the main piers one compartment as at Caen. It is worth note also that the transverse arches are slightly pointed, though everything else in the interior is round-arched ; another example of the use of the pointed arch for structural reasons only.

Unfortunately the Anglo-Norman builders did not in general exhibit the enterprise shown at Durham in carrying out the complete vaulting of the roof. Peterborough, one of the finest Norman interiors (325), has only a timber roof ; in other cases as at Norwich and Tewkesbury, the vaulting is of later date and

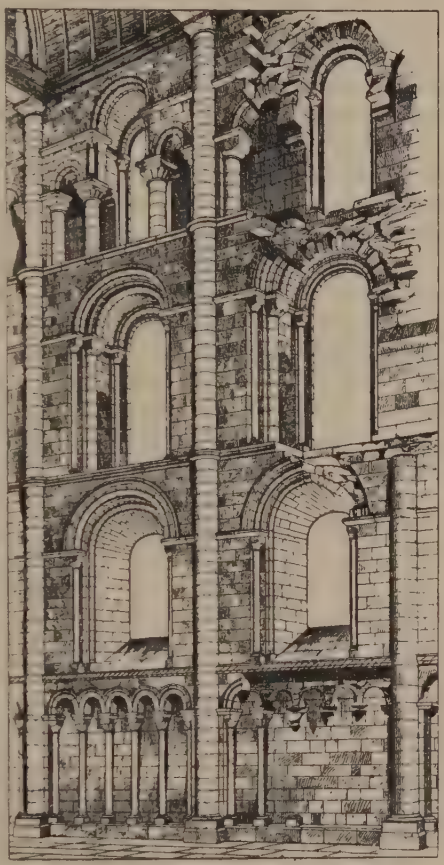
321 Durham Cathedral : The Norman Nave (early 12th century)

322 West Front, Tewkesbury (early 12th century)

323 Norman Doorway, Llandaff Cathedral (12th century)

324 Norwich Cathedral : The Norman Nave with its 15th century Vault (*left*)

not in harmony with the rest of the architecture. Durham is the only example in England of a completely vaulted Romanesque church on a large scale. Among the other most noteworthy Norman churches in England are St Albans; Ely (nave and transepts); Gloucester (nave); Norwich; Romsey Abbey (choir); Tewkesbury (nave, transepts, and tower). At Gloucester and Tewkesbury the piers are, as at Tournus, cylindrical built-up columns, with only a moulding for capital (317). Norwich is a cathedral rather remarkable, externally, for the naïve and rather German character of its architecture, with its prevalence of wall-arcading and long flat strips of pilasters; it has less affinity with French work than any other Anglo-Norman cathedral. Ely is remarkable for the bold and unusual design of the west front, of which only one half is now standing; and Exeter for the unusual position of the two towers (the only Norman work remaining) at opposite sides of the church, at the junction of the nave and aisles. At Tewkesbury, where there are columns instead of piers in the nave arcade, there is a special provision for seating adequately the ponderous central tower; the crossing piers are extended eastward and westward into solid masses of wall, to keep the thrust of the tower off the nave and choir arcades. It is a fine piece of building; and Tewkesbury tower stands firm to this day, as some other Norman towers have not stood.

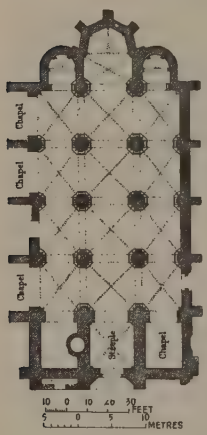


325. Transept, Peterborough (early 12th century).

One point in which Anglo-Norman Romanesque is superior to Norman is in its mouldings. There is a great general similarity between the design of a bay of the nave of Cérisy and that of a bay of Peterborough; but instead of the hard edges of the two orders of arches in the nave arcade of Cérisy, Peterborough shows a series of mouldings which give the arch a much finer and more dignified effect. And this distinction of English work as compared with French is kept up throughout the whole of the succeeding period of Gothic architecture; the English mouldings are much finer and more varied in profile

than the French, except only in the matter of doorways. The English doorways do not emulate, either in the Romanesque or Gothic period, the deeply recessed and many-moulded portals of the French cathedrals ; but in the larger arcades and arches the English mouldings are far superior. In Anglo-Norman work there is no finer example of this than the great exterior arch of the west front of Tewkesbury (322), with its six orders of arches and jamb-shafts, almost as sharp and clean-cut now as the day it was built. The effect is somewhat spoiled now by the large debased Gothic window with which it was filled up in (probably) the sixteenth century, but it is still one of the grandest and most impressive pieces of English Romanesque building.

Before taking leave of the Normans we must glance at their twelfth-century work in Sicily and South Italy ; for while Italian architecture was assailed by German influence in the north, it was assailed by Norman conquest in the south, with curious results, which show how strong is the influence of locality as against race. Here a southern richness of effect is mingled with both Byzantine and Saracenic influence in detail (the Saracens having previously had temporary possession of the land), so that one can hardly imagine the work here to be that of the same race of men who built the Romanesque churches of Normandy. The church of S. Carcere, Catania, has a remarkable deeply-recessed round-arched doorway with every jamb-shaft covered with geometric diaper, and the arch-mould equally enriched. Still, the general form is Norman. The interior of Cefalu cathedral shows us marble columns with quasi-Corinthian capitals, carrying stilted pointed arches with flat soffits ; in the cloisters the capitals alternate between Classic and Byzantine character. In the Capella Palatina, Palermo, there is a mixture of Romanesque, Greek, and Saracenic elements, the wooden roof imitating the Saracenic form of stalactite vault (for which see next chapter). In the cathedral of Monreale (late twelfth century), and in the church of La Martorana at Palermo (328), there is the same stilted pointed arcade, and columns with classic capitals as at Cefalu (329). Though these were erected at the bidding of Norman conquerors, it is evident that Saracenic artists must have been employed upon them. The ground plans of the Norman Sicilian churches are mostly of the Latin rather than the Romanesque type.



326.
Plan of S. Miguel, Palencia (late 12th century).

The Romanesque influence extended to Spain ; a country, however, in which, from its outlying position, architectural forms started in the central countries of Europe underwent much local modification. Spanish Gothic, in fact, came to have almost a separate architectural history of its own ; and Spanish Romanesque has a special character which it is difficult exactly to define in words, except in regard to plan. As English Romanesque and Gothic buildings are distinguished by their great length, Spanish church plans are distinguished by their unusually wide proportions (326). A remarkable point in regard to the churches which must be

classified as Romanesque is that the pointed arch seems to have been used in some of them at an earlier period than elsewhere in Europe. In the small old cathedral of Salamanca, which Street dates as early as the twelfth century, the plans of piers and the sections of the arches—the latter in two square unmoulded rings—are exactly what one might expect to find in a Norman church of the same date, but the arches are sharply and decisively pointed ; a fact no doubt attributable to Moorish influence. Many of the smaller openings in the same church are, however, round-arched, others pointed, and there seems to have been in Spain, at this time, little choice between the two. We meet, however, here and there, as at S. Maria, Benavente, the familiar detail of the outside shafts used as buttresses to the apse ; this is seen also on the exterior of Toro cathedral (327) which has a good deal of Italian Romanesque character in the details, though not in the general composition. At S. Isodoro, Leon, the round-arched doorway and the wall arcade over are very Norman in character, but are flanked by deep buttresses with set-offs, which in France would be taken to be a century later than the doorway and arcade In the cathedral of Santiago de Compostella, which Street suggests is a copy of St Sernin at Toulouse, we come on completely Romanesque architecture—round arches and a round waggon-vault with the Romanesque transverse arch over the main piers, springing from a vaulting shaft carried from the floor. Here and elsewhere in the Romanesque architecture of Spain is to be noticed the great tendency to the ugly device of stilting the arch, *i.e.*, not commencing the actual arch till some distance above the impost. At Tarragona cathedral we again find, as at Salamanca, the Romanesque style of pier and arch section combined with the pointed arch, while the cloister shows coupled columns with a round-arched arcade springing from an abacus common to both columns, as at Arles ; but the cloister is cross-vaulted instead of being waggon-vaulted. The small church of San Pedro, at Huesca, shows a Latin plan with a centre and side apses and a circular waggon-vault with transverse ribs, of pure Romanesque style ; and in the deeply recessed doorway at Salas, near Huesca, we can almost recognise a Norman doorway with its zigzag ornaments in the arches. In Portugal typical Romanesque work is to be found in the old cathedral at Coimbra.

Romanesque decorative detail is very varied ; the most interesting portion of it consists in the treatment of carved capitals of the quasi-Classic or quasi-Byzantine order. In the collected Romanesque capitals of France and North Italy of this period may be found almost every kind of variation on the Classic capital, as well as on other Classic details ; many of the forms of capital, sometimes rudely carved, would be quite worth further development in modern work, as a change from the perpetual imitation of the orthodox Classic capital. The Norman forms of running ornament, of which the zigzag and the billet are the principal, are often somewhat crude.

The period that we have been briefly surveying in this chapter is perhaps the most extraordinary and in a sense the most interesting in architectural history ; a period of prolonged struggle and experiment towards making a new and complete style of architecture out of the leavings of the antique

world ; in the course of which many grand and picturesque buildings were produced, but nothing was evolved that seemed to be complete and satisfactory as a culmination, mainly because there was the continual effort to compel the Roman round arch into a form of structure for which its terms were not sufficiently elastic. It was left to the structural introduction of the pointed arch to afford the means for the creation of the greatest and most consistent architectural style since that perfected by the Greeks.

327 Spanish Romanesque : Toro Cathedral

329 Cefalu : The Cathedral (12th century)

328 Church of La Martorana, Palermo (early 12th century) (*left*)

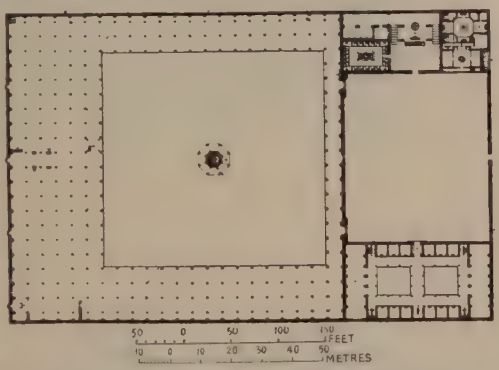
330 Interior of " Dome of the Rock " (7th century)

331 " Dome of the Rock," Jerusalem : Exterior

CHAPTER V

SARACENIC ARCHITECTURE

SARACENIC architecture follows and is conterminous with Mohammedan religion and Mohammedan conquest; yet at its outset that religion had no traditional form of temple, and was affiliated with no traditional school of architecture. The initial creed of Mohammed might have adopted for its own the Pauline utterance that "the Most High dwelleth not in temples made with hands." The first mosque, at Medina, was a courtyard partly roofed with palm branches covered with plaster and supported by tree trunks. And this plan became the general model for the mosque wherever erected, until, after the capture of Constantinople by the Turks in the fifteenth century, and the annexation of the church of Hagia Sophia as a mosque, the architectural grandeur of this wonderful building led to some attempts in later mosques to repeat its architectural disposition of a cross plan with a domed centre. With the exception of these later examples, chiefly at Constantinople, the mosque, wherever we find it—in Africa, India, or Spain—has the same general form of plan; an enclosed square, of which a considerable portion is covered with arcades carrying a flat roof. The most typical mosque plan is one in which the arcaded portion is narrow on the entrance side and on the right and left sides, and deeper, with several bays of arcades, at the upper end (332). This end is supposed to be orientated towards Mecca, the birthplace of the prophet, and the site of the sacred shrine of the Kaabah (though the orientation is not very precisely carried out in many cases), and in its wall is always a specially sacred prayer-niche, the mihrab, on which, and on its vicinity, the most sumptuous decoration of the interior is lavished. In some of the larger mosques there are two or three mihrabs in the end wall. In some cases, as in the celebrated mosque at Cordova, the arcading is carried out over the whole area, but in general the greater area of arcading and roofing at the upper end is the rule—naturally, since this is the portion of the mosque most sacred to the devout worshipper. In the late fourteenth-century mosque at Mecca, erected *round* the Kaabah, and rebuilt in the sixteenth century, the sacred shrine being in the centre of the



332. Plan of Mosque of Amrou, Cairo (7th century).

court, the arcades are of the same depth on all four sides, there being no motive for the architectural accentuation of any one of them.

It must be remembered that the mosque is not, like the Greek temple or the mediæval cathedral, erected in honour of the Deity ; it is erected for the shelter of the worshippers and the provision of a place of prayer and of temporary seclusion from the outer world. This explains its architectural style, its generally low proportions, and the wide area covered in comparison with the height of the building ; it is not an architecture either of mystic significance, like the Egyptian or the Greek temple, nor an architecture of aspiration, like the mediæval cathedral ; for the minaret (a late addition) is a purely practical provision for enabling the call to prayers to be proclaimed audibly from a height. But the Mohammedan was from the first a religion of conquest, and the early and brilliant success of the Arabian arms soon led (as great military success always has led in every nation that has captured it) to an ambition for its illustration in splendid and costly works of architecture, entirely at variance with the stern simplicity of the original programme. And it is in this attempt that the peculiar position of Saracenic architecture becomes apparent. We have not here, as with the Romans, the case of a conquering nation carrying its own architectural style everywhere with it ; the Arabians had no architectural style to take with them. Even the nationality of Mohammedanism was, from its first century of existence, strangely mixed ; it was reinforced by a crowd of converts collected together from Persia, from Syria, from Egypt. Its conquests were those of an army of religious zealots, desirous to glorify their successes by the erection of beautiful buildings as outward and visible emblems of their faith, and making use for this purpose of the artists and the artistic resources of the countries they conquered, yet preserving through all this process of selection the paramount influence of their special religious faith and practice, which, in a manner perceptible, but not easily definable in words, permeated all their architectural work, and gave to their buildings in various countries the general character which has been currently called Saracenic, but which perhaps might more correctly be called Mohammedan.

Reference has already been made (page 113) to the octagonal building at Jerusalem known as the "Dome of the Rock" (330, 331), and otherwise popularly called the Mosque of Omar—very absurdly, since no Omar had anything to do with it, and it is not and never could have been a mosque. For some reason, which Mohammedans themselves would perhaps be unable to explain, the rock in the centre was regarded by them as a specially sacred spot, and the building was apparently erected merely to give shelter to pilgrims who visited it. As already observed, it was no doubt erected by Byzantine artists, and is practically Byzantine architecture. Its neighbour, the mosque El Aksa, however (333) built about the same time and to the order of the same khalif, Abd-el-Melik, was really a mosque, and originally of the mosque type of plan, or nearly so ; only a portion of it is left now, much altered by the Crusaders. This is one of the earliest important buildings really planned and designed as a mosque. Like the Dome of the Rock, it has a good deal of the Byzantine element in it ; obviously so in the design of the capitals, some of which are variations on the Corinthian

333 Interior of Mosque El Aksa (late 7th century)

334 Mosque of Sultan Berqouq (late 14th century)

335 View of Arcade, Ibn-Touloun (late 8th century)

336 Interior of Great Mosque, Damascus (8th century) (*above left*)

337 East Arcade of the Mosque of Amrou (7th century) (*above right*)

338 Interior of Mosque at Kerouan (late 7th century) (*left*)

form of capital, others are basket-work capitals with the convex outline which belongs so peculiarly to Byzantine work. The theory has been set up that the marble columns were, as in so many Byzantine buildings, spoils from older buildings ; but the evidence collected by Hayter Lewis, in his work *The Holy Places of Jerusalem*, makes it probable that the columns were really from a marble quarry near at hand. The general trend of the evidence leads to the conclusion that this was an Arab building, with traces of Byzantine influence in the details. The arches are all pointed ; those of the upper arcade, above the horizontal beam connecting the columns, are of the four-centred type, with the upper portion of the curve nearly a straight line. These arcades are probably much later than the foundation of the building, which dates from the end of the seventh century, though it appears to have been nearly rebuilt (after damage from earthquakes) at the end of the eighth century. The Crusaders transformed the building temporarily into a palace, and Fergusson attributes to them the erection of the four-centred arches, though this seems to be merely conjecture.

One cannot, in short, base any very positive conclusions on a building which has such a complicated history, and has been so much pulled about and altered, as the El-Aksa mosque. But the facts remain that the arches are all pointed, and that some of them, whenever and by whoever built, take the four-centred form of pointed arch. Supposing these latter to have been erected by the Crusaders, they must have had some local motive for adopting a form not known to European builders till centuries later. And it is more reasonable to suppose that this form of arch is in itself a presumption that it was the work of the Arabs. The form of four-centred arch, in which the upper portion of the arch is nearly or sometimes quite a straight line, is frequently found in Egyptian Saracenic architecture, and almost universally in Indo-Saracenic. It came from Persia ; it is an essentially Persian form, and is found in the main arches of the early bridge at Dizfoul in Persia, illustrated by Dieulafoy. It is obviously employed there for constructive reasons in order to render stronger the crown of the arches bridging the stream ; the intermediate small arches in the upper portion of the piers are semicircular. Obviously, when the building ambition of the Arabs was awakened after their first conquests, having no architectural tradition of their own, they drew in the first instance on the Persians, and adopted some of their forms, which became favourite forms afterwards from mere custom, after their structural origin had been forgotten. And this explains the peculiar prevalence of the four-centred arch form in Mohammedan architecture in India, with which Persia is so closely connected geographically.

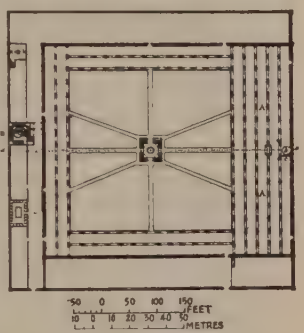
The employment of the ordinary two-centred pointed arch in Saracenic architecture seems to have followed on the Arabian conquest of Egypt, where they found the Coptic churches of Egypt using the pointed arch, apparently for exactly the same reason that it was used in the cross arches at Périgueux—because they lacked skill to build a large round arch which should be secure at the crown. It is probable that the Coptic builders were actually employed by the Arab conquerors in the building of mosques ; there is an accepted tradition that the architect of the mosque of Ibn-Touloun at Cairo (ninth century) was

a Christian Copt. Once the pointed arch was accepted, a ritual so conservative and uncompromising as the Mohammedan would tend to keep the forms of building the same.

These are probably the influences which gave rise to the constant use of the pointed arch in Saracenic work. This usage is entirely distinct from the introduction and development of the pointed arch in European Gothic, which arose in a different way and for different reasons, and Saracenic pointed architecture has no necessary relation with European pointed, though, as we saw in the previous chapter, it did, owing to special circumstances, exercise an influence on Spanish Romanesque. The Roman semicircular arch in its pure form is never found in Saracenic work, except in some minor features of the later Cairene mosques ; but the form which has been called in England the " horse-shoe " arch, *i.e.*, the round arch with the half-circle prolonged and returned beyond the springing line, dipping beneath the centre of the arch, is a form frequently used, and by many is popularly supposed to be the real and typical Saracenic arch. This, however, is not the case. There is a very slight tendency to the form in some of the older Cairene mosques, but it is not prominent there ; it is not found at all in the Saracenic work in Sicily, nor in Indo-Saracenic architecture. It seems to have been a form of arch used chiefly in Morocco and Spain, and it is not very easy to explain its origin or object. Choisy has devoted to it one of his ingenious constructional theories, to the effect that in a brick building to be covered with plaster, bricks were left protruding below the line of the impost, in order to carry the wooden centering for the arch, and that it was easy afterwards to obliterate the bad effect of these projections by continuing the reversed curve of the arch down upon them in the plaster finishing. A more probable explanation seems to be that some of the builders of long arcades on rather small piers or columns had an impression that the return of the arch in this way, in the reverse way to the upper part of its curve, had the effect of neutralising to some extent its outward thrust. In a few instances the horse-shoe curve is found combined with a slightly pointed arch ; but in general the horse-shoe arch is part of a plain circle, and this very fact seems to render probable the explanation just given, that it is a device with the idea of neutralising thrust ; where the arch was pointed the thrust would be less.

We must now endeavour, as far as our limits will allow, to note and illustrate the most typical variations in style which Mohammedan architecture assumed in the different periods and countries in which it was practised. Of the most important mosque of the early period of conquest in Egypt, that of Amrou, founded in 642 in what is now Old Cairo, a considerable portion has disappeared, but its plan (already given, 332), is known—the typical mosque plan with arcades six bays deep on the mihrab side of the enclosure. This portion remains (337), and consists of arches mostly round, but some slightly pointed, carried on columns with carved capitals which were probably the spoils from older buildings. On each capital is a rather high square block, above which springs the arch, its first course slightly wider than the block, projecting beyond it, and some of the arches show a slight indication of the horse-shoe curve. The arches are all tied by wooden tie-rods fixed into the middle of the

square block referred to. It has been questioned whether this arcade is part of the original foundation, but it probably is ; there is nothing in the details against the supposition. The next large Egyptian mosque, Ibn-Touloun (877), of which also only portions are left (though it was nearly complete as late as 1860), shows an important change in the architectural treatment. It is a brick building cased in plaster, with a good deal of decorative treatment in the soffits and archivolts of the arches ; but instead of columns, the arches are carried on large wide rectangular piers (339), with angle shafts with a form of cap which is characteristic of the Cairo neighbourhood ; the piers carry pointed arches, a good deal stilted and with the flat soffit which is usual in Saracenic architecture ; the moulded arch with receding orders, characteristic of European arched architecture, is never found in Saracenic architecture. It may be added here that the stilted form of pointed arch is of constant recurrence in the latter. It was possibly a survival of such an arrangement as that of the mosque of Amrou, the upright block above the capital becoming merged into the arch, and the stilting then becoming traditional. The general plan of the Ibn-Touloun mosque resembles that of Amrou, with the difference that while in the latter the whole of the arcades run parallel with the centre axis of the court, at Ibn-Touloun the arcades of the prayer-chamber are at right angles to the main axis, and ran parallel with the mihrab wall instead of running across the chamber as at Amrou ; the desire of getting a better abutment was no doubt the cause of the change. In the centre of the courtyard is a domed erection, probably originally built as a tomb—perhaps that of the founder. The external windows are filled in with stone slabs pierced in an elaborate decorative design ; a feature no doubt suggested originally by Byzantine work, but carried out here in those complicated geometrical patterns which are a peculiar feature of Saracenic decoration.



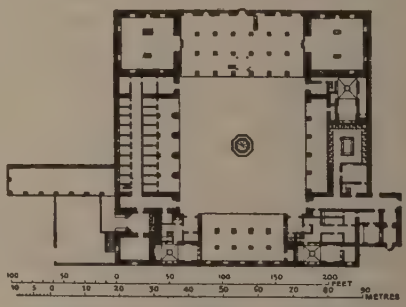
339. Plan of Ibn-Touloun.

An early mosque of somewhat the same type as that of Amrou is the great mosque at Damascus (336), founded in the eighth century, in which, however, the plan, instead of being nearly square, is, so to speak, much wider than its length, the arcades of the place of prayer forming three aisles running, like those of Ibn-Touloun, parallel with the mihrab wall. The Damascus mosque, on the site of a church founded by Constantine, probably incorporated much of the earlier structure. The arches, round or with just the suspicion of a point, are carried on columns with Corinthian capitals which do not belong to them, both columns and capitals being probably the *disjecta membra* of older buildings ; on the capitals are placed large rough dosseret blocks of the Byzantine type to form imposts for the arches, a detail which goes to confirm the opinion already expressed (page 113) as to the origin of the dosseret. The remains of another, much later, Syrian mosque may be mentioned here, that at Baalbek, of the late thirteenth century, of which the unroofed arcades remain—pointed arches

springing from battered antique Corinthian capitals supported on rather stumpy cylindrical columns ; one of the most singular medleys of architectural style to be found anywhere in the world.

Returning to Egypt, we find the same type of plan prevailing in the mosques down to the middle of the fourteenth century, as illustrated in the mosques of El-Azhar (tenth century) and El-Hákim (eleventh century), both at Cairo. The remains of the latter show piers with angle shafts similar to those of Ibn-Touloun. There should also be mentioned the great mosque at Kerouan, or Kairwan, in Tunisia (338), founded at the end of the seventh century, but probably partly rebuilt or altered later, which is believed have to been the model for El-Azhar, and which on the other hand undoubtedly influenced the style of the Cordova mosque, to be mentioned presently. But by the thirteenth century we find the first symptom of a change in the plan and idea of the Egyptian mosque, in the mosque of Sultan Kalaoun, part of a remarkable collection of buildings founded about 1285, in which, instead of the multitudinous colonnades of the old type, the place of prayer is a three-aisled apartment with a wider centre avenue, the longer axis at right angles to the mihrab wall; it almost suggests a three-aisled church. But a still greater and more striking change appears in the mosque of Sultan Hassan, founded in the middle of the fourteenth century, in which the main plan (340) is a Greek cross, the centre space open, the four courts opening out of it roofed with pointed waggon vaults, while beyond the mihrab wall is a square apartment roofed with a pointed dome. All these domed mosques, which become rather frequent in Cairo after this, are also tombs—mausolea ; in a mosque pure and simple, for prayer alone, the dome had no place, until after the annexation of Hagia Sophia in the fifteenth century. Following on this is the fine mosque of Sultan Berquouq (334 and 341), outside Cairo, some thirty years later, in which the place of prayer returns to the old plan of a wide and shallow arcaded hall, vaulted on arches carried in both directions, and flanked at each end by a square compartment covered with a dome of the stilted four-centred outline so common already in Saracenic arcading. Of the fifteenth century is the smaller but singularly beautiful tomb-mosque

340. Plan of Mosque of Sultan Hassan, Cairo (14th century).



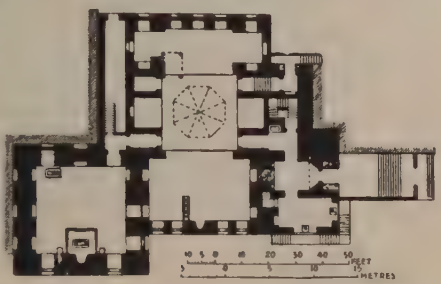
341. Plan of Mosque of Sultan Berquouq.

342 Mosque of Kaitbey, Cairo (15th century). (The minaret is a later addition)

343 Interior of Mosque at Cordova (late 8th century)

344 Toledo : 14th century Mosque

of Kaitbey (342, 345, and 349), with a pointed dome of similar outline. This and other domes of the same type and period are decorated externally with elaborate ornament in relief, either carved on the stone or modelled in plaster. It is worth note that in the Kaitbey and others of these domed mosques, in spite of the pointed outline of the dome itself, the small openings in the drum of the dome are round-arched. Why the round arch should have been accepted in this position, in contradistinction to the general use of the pointed arch, it is not easy to understand.

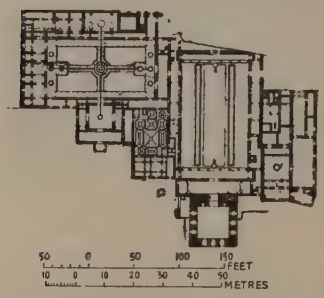


345. Plan of Mosque of Kaitbey.

It was early in the eighth century that Mohammedan conquest extended to Spain. The mosque of Cordova was commenced in 786 by Moorish builders, to some degree in imitation of their mosque at Kerouan or Kairwan, before-mentioned. The architecture of the Kerouan mosque shows pointed arches with a small development of the horse-shoe return ; the facing arches on solid piers with slight attached columns, the interior arcades on single columns only. The Cordova mosque was to be the centre of Spanish Islam. It is planned on a great scale, and after the open entrance courtyard was passed the whole area was columned and arcaded, instead of having only the upper area near the mihrab covered. If the horse-shoe arch was suggested at Kerouan, it is rampant at Cordova (343) and almost everywhere in Spain where the Mohammedan conquest penetrated. The arcades are carried on polished marble columns with rudely carved quasi-Classic or quasi-Byzantine capitals (for both concave and convex types of capital appear), and the columns having apparently been found too short, they carry a bracketed-out pier above, which forms the abutment to a second set of arches to carry the roof, all the arches being built with alternating stone and brick voussoirs. At the part forming the approach to the mihrab the design is further complicated by the arches being cusped and richly ornamented ; the whole internal effect being that of a picturesque but somewhat barbaric confusion of lines. The vault over the mihrab (347) is an example on a small scale of a system of groining peculiar to Saracenic building, afterwards used on a much larger scale in some Indo-Saracenic buildings, in which the ribs cross to alternate angles, so that each intersects with two other ribs in its course. The exterior of the mosque, with its masses of plain wall and square tower-like projections, is sober and monumental in character, a great contrast to the architectural riot within. The predilection for the horse-shoe arch is seen still more decisively in the mosque, now the church of El Cristo, at Toledo, where stumpy columns with clumsily carved capitals carry huge heavy horse-shoe arches at right angles to one another, four seated on one column ; and the mosque, which is now the church of S. Maria la Bianca (344), shows the same character of design. This use of the horse-shoe arch seems to imply already a very strong Moorish influence in Spain ; of the Moorish predilection for it

we find evidence in the mosque at Tlemcen, in Morocco, at a much later date (thirteenth century), where there are the same ponderous horse-shoe arches resting on short piers that we find at Toledo.

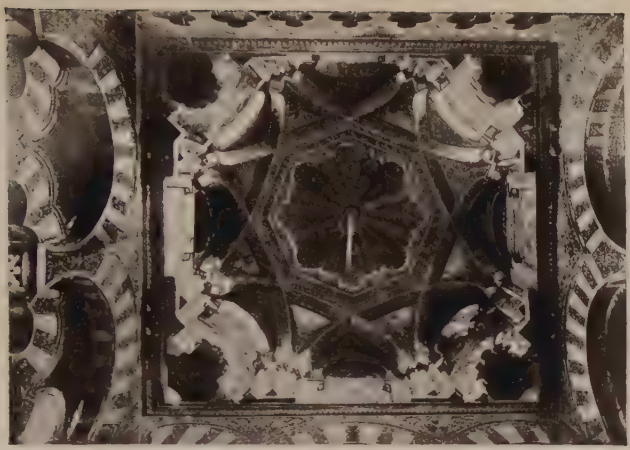
It was in 1085 that the Arab leaders in Spain appealed to Morocco for armed assistance against Alfonso VI., and thenceforth the Mohammedan architecture of Spain is practically Moorish, or at least assumes a form that may be called Moresque. The result was a still increased richness in ornament and colour, as exemplified in the Villa Viciosa chapel added to the Cordova mosque ; in the Alcazar and the Giralda tower at Seville ; and in the interior of the palace of the Alhambra, that casket of gems hidden behind a stern fortress-like exterior. As Girault de Prangey says of them, " Les Arabes-Mores *brodaient* tout dans leur edifices." The Giralda tower (348) is a high square mass covered for a great part of its surface with lace-like ornament, and finished, with a Renaissance termination, which on the whole goes pretty well with the rest as a composition. How it was, or was to have been, finished we may probably judge from the somewhat similar tower of the mosque at Sidi-bu-Medina at Tlemcen (350).



346. Plan of the Alhambra, Granada.

The Alhambra (351 and 352), architecturally, stands alone ; it is like nothing else. In it the exuberant fancy of Moorish taste comes to its climax ; nothing in richness and delicacy of detail can go further. It was commenced when, in the middle of the thirteenth century, the Moorish power had been driven from Seville ; and was probably carried on, piece by piece, down to the middle of the fourteenth century. Some of the exterior portions, such as the Puerta del Vino, have a solid architectural character with which the beauty of the surface decoration does not interfere. But the interior is the architecture of a dream, with almost the evanescent character of dream architecture. The stilted pointed arches of Egypt, built in solid stone or brick, have become pierced panels of hanging work between vertical framing, mostly in wood covered with painted plaster decoration, standing on slender columns which could carry no more monumental construction. But it is the architectural symbol of what was probably, while it lasted, the most splendid, romantic, and chivalrous phase of life in all human history. The glamour of it still hangs about the very names of Granada and the Alhambra.

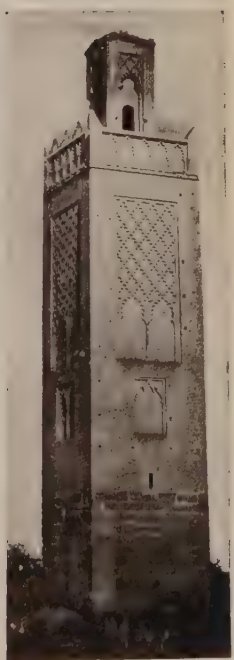
Reference has already been made (pp. 174-5) to the amount of Saracenic detail and character in the churches built under Roman rule in Sicily ; but this is not Saracenic architecture, it is only the result of the employment of Saracenic artificers by northern invaders. The Zisa palace at Palermo has been catalogued among Saracenic buildings ; it might be better described as a Romanesque building erected by Saracenic workmen, who, because it was their habit, put in pointed arches instead of round ones. The cloister arcade at Monreale (356)



347 Plan of Vault over Mihrab, Cordova Mosque (10th century)

348 The Giralda Tower, Seville (12th century)

349 Decorative Detail, Mosque of Kaitbey (15th century)



350 Tower at Tlemcen (12th century)

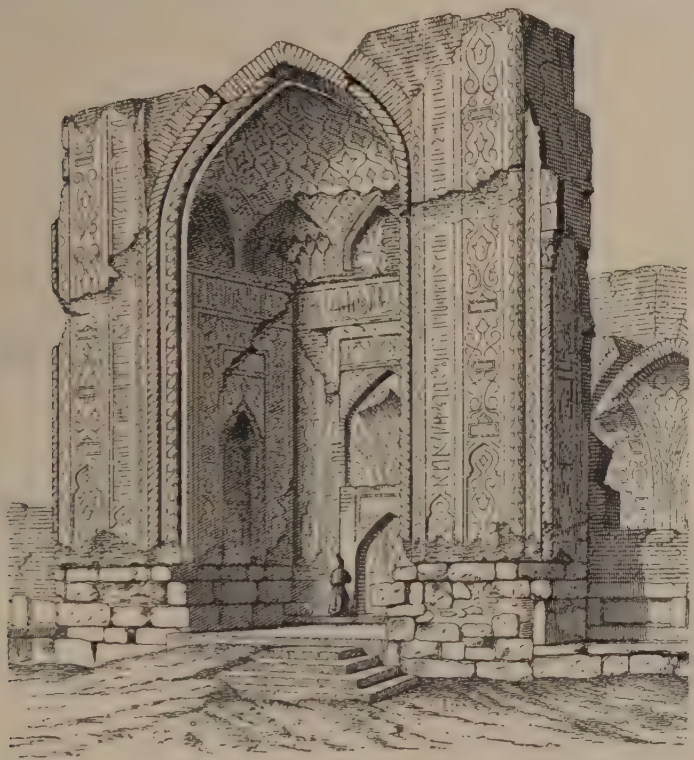
351 Court of the Lions : Interior showing Stalactite Vaults

352 Court of the Lions : A Pavilion (1377–91) (*left*)

THE ALHAMBRA, GRANADA

is a more curious paradox ; that is work done under Norman rule, but the stilted and pointed arches are distinctly Saracenic in character.

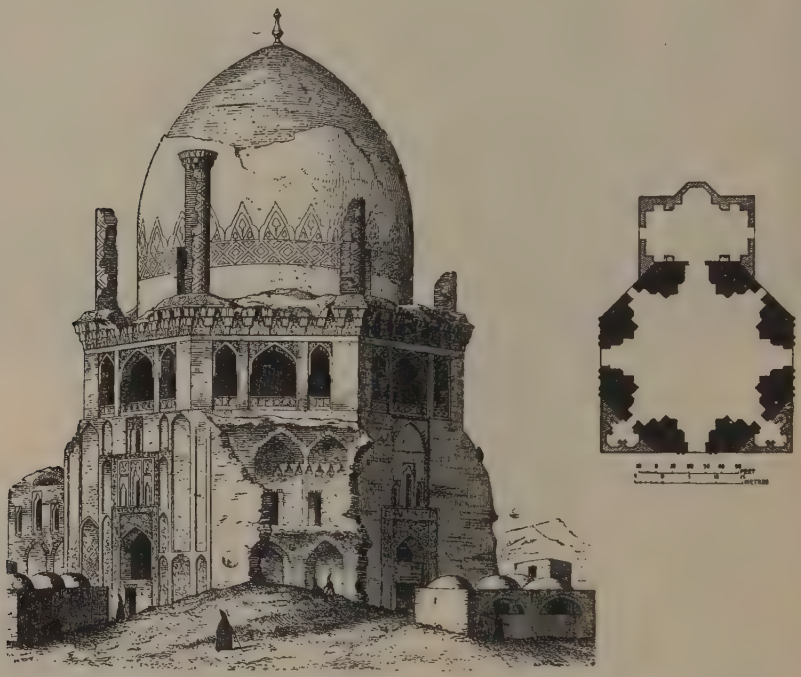
We have yet to glance at the Persian work, so far as any of it remains. Many buildings must have been destroyed, for nothing remains of what must have been the glory of Bagdad in the eighth and early ninth centuries. Outside of Bagdad are two tombs, one called the Tomb of Zobeide (wife of " the great Haroun-al-Rashid "), the other called the " Tomb of Ezekiel," of which the



353. Entrance Porch of Ruined Mosque at Tabreez (early 13th century).

centres are covered by a peculiar construction, built up of a succession of stories of overhanging niches, convex on the exterior, which are very ugly in external appearance, but are of some interest as a possible suggestion of the form of stalactite vault afterwards in common use in Egyptian Saracenic, and later in Moresque work. Into Persian Saracenic the horse-shoe arch never enters ; the Persian arch is either the plain pointed arch or the four-centred arch ; the latter more commonly. The ruined mosque of Tabreez, dating from the early thirteenth century, is quite different from the normal mosque in plan, being more like a Byzantine church with a central domed area. The fact is that Mohammedan building in Persia was more or less influenced by the traditions of the native Sassanian domed style of earlier centuries. The great entrance

porch (353), with its lofty four-centred arch and the flat decorative treatment of the wall at each side, is typical of the Persian Saracenic style ; a finer and better preserved example is the porch of a tomb connected with the mosque of Chah-Sindeh at Samarkand, a photograph of which is given in M. Saladin's *Manuel d'Art Musulman*. Here we have the lofty four-centred arch with its elaborately decorated spandrels, while the walls on each side are divided up into long strips of vertical panels decorated with inlaid ornament and with decorative inscriptions (probably from the Koran). Another remarkable building, of the early fourteenth century, is the domed tomb at Sultanieh (354),



354. Plan and View of Domed Tomb at Sultanieh (early 14th century).

erected by the successor of the founder of the mosque at Tabreez. The interior ground plan is an octagon, bracketed over into a circle for the base of the dome, which is a solid pointed-arch one, rising from an octagon base with a small arcade of four-centred arches externally. In its complete state this must have been an exceedingly fine architectural creation, both internally and externally, and essentially different from any Saracenic architecture in Africa or Spain, though there are resemblances in detail.

Perhaps the principal interest of the scattered and dilapidated remains of Persian Saracenic is that the style furnishes the basis of the greater buildings of the Indo-Saracenic architects, which are for the most part essentially Persian in character. These, and the mosques of the later Turkish period, being of the

sixteenth and following centuries, would chronologically come into our last chapter on the modern or post-Renaissance period ; but Saracenic architecture, even in its later developments, is so entirely outside of and unaffected by the Renaissance, that it is better to treat it continuously as a thing apart from other architecture of the modern period.

The earlier Mohammedan conquerors in India, in the thirteenth and fourteenth centuries, adopted, or appeared to adopt, more of the indigenous style of architecture of the country than was usual with Saracenic invaders ; and the reason for this probably was that in the Jaina temples of India the Pathan conquerors found a form of plan—a large court partly vaulted on a number of columns—which was so similar to the normal mosque plan that it was capable of adoption as a mosque with little alteration. In some cases the pillars of the Hindu building may have been taken down and re-arranged ; in other cases they were probably left standing, though they may have been screened with a new façade either internal or external. This appears to have been the case with the Kutub mosque at Delhi and the mosque at Ajmir, both of the early thirteenth century. Among the special features of Jaina architecture were the use of bracket capitals and the avoidance (as in all Hindu architecture) of the arch as a constructional feature. Now the mosque at Ajmir, in its original state, was evidently a Jaina temple consisting of an open courtyard with a vaulted cloister all round—just the thing for a mosque, except that it wanted the greater development and emphasis proper to the covered portion at the inner end of the courtyard ; and to give it this, the Pathans erected in front of it a very fine arcaded screen, which, with its pointed four-centred arches beneath rectangular panel mouldings, is completely Persian in character, and the juxtaposition of this with the Jaina architecture is a curious but of unpremeditated architectural history, like the addition of a Renaissance screen to a Gothic church. In fact, as M. Saladin puts it, Persian architecture took the same place in respect to India that the Renaissance Italian took in respect to France and Spain.

It is hardly necessary or in place, in a short treatise of this kind, to go into any account of the various phases of purely Hindu architecture, almost as numerous and bewildering as the legends of the Hindu mythology, and as little allied to the pure reason which should be the basis of architecture. The one feature of any value which the Hindus may be said to have contributed to architecture is the bracket capital, as seen in the colonnade of the Kutub at Delhi, which, as a means of shortening the span of the architrave, is a good and logical constructive expedient. The bracket projecting from the face, in this case, is doing no work, but it may have carried something that has now disappeared. The work belongs to the best type, the Jaina type, of Hindu architecture. The plans of many of the Jaina temples, as conceptions in plan, are very fine ; and the interior of the octagon hall in the temple of Vimala Sah, Mount Abu (355), built in the middle of the eleventh century, may be taken to represent pure Hindu architecture at its best. The function of the four-way bracket capital in supporting the different members of the superstructure is clearly seen here, and the view shows also another original feature of Jaina architecture, the long elaborately ornamented struts which are carried up to

the under side of the lintels, with the idea of supporting them in the centre. The idea is an illusion in a structural sense ; as wooden brackets they might be of use ; as stone, they would crack at the first real strain on them. The general effect of the interior may be considered very picturesque.

The palace at Gwalior, part of which is shown in Fig. 358, is an exceptional example of a very fine building erected by a Hindu ruler, but obviously under the influence of Mohammedan architecture ; in fact, from its general design it would at first sight be taken for Indo-Saracenic work, but this is quite an exceptional building.

Down to the sixteenth century, in the Mohammedan regions of India, there is still a mingling of Hindu elements with the features of the new architecture. In the plan of the Jumma Musjid at Ahmedabad, built as a mosque in the middle of the fifteenth century, the plan of the prayer enclosure at the upper end is of the same character as that of a Jaina temple, with its columns forming alternate square and octagonal compartments, the latter with domical roofs, while the front screen (360) is of a mingled Indian and Persian type. Between this period and the sixteenth century various mosque buildings have been illustrated, and there are no doubt numbers more which have hardly been investigated, which exhibit a combination of the Persian pointed arcade with details of a Hindu origin ; one even, at Gaur, illustrated by Fergusson, shows the Hindu type of thickset shapeless piers with heavy pointed arches built on them ; one of the oddest combinations to be found in architecture.

It is not till we come to the rise of the Mogul Empire in the sixteenth century, and especially to the works carried out by its greatest ruler, Akbar, in the latter half of the sixteenth century, and by his grandson, Shah Jehan, that we come to the true and great Indo-Saracenic style. The great gate of Akbar's mosque at Futtehpore Sikri (357) is a noble and consistent piece of architecture from which every trace of the barbaric element of Hindu architecture has disappeared, and which is a new development of Persian ideals. It is true that in Akbar's palace at the same place the Hindu types of column and bracket capitals and struts are to be seen (359), but the lavish decoration with which they are covered is not of the Hindu stamp. The crowning glory of the Indo-Saracenic style is, of course, Shah Jehan's renowned tomb building, the Taj Mahal at Agra (364), in which Persian feeling is again strongly developed, and which is one of the most beautiful and consistent creations of architecture. The same ruler's Pearl Mosque at Agra (365), with its square piers and heavy pointed and foliated arches, is another fine and characteristic example of Mohammedan architecture on Indian soil.

At Bijapur, under the dynasty of the Adil Shahs, there was another special development of Indo-Saracenic architecture, illustrated especially by the Jumma Musjid (360) and the domed tomb of Mahmoud ; the former of the latter half of the sixteenth, the latter in the early part of the seventeenth century. The inner or prayer quarter of the mosque is unusually deep in plan, nine bays of vaulting across and five in depth, but the special feature here is the wide space in the centre covered by a dome of peculiar construction, for which an octagonal base is formed on a system which, on plan (361), consists of two

355 Hall in Temple of Vimala Sah, Mount Abu, India (11th century) (*above*)

356 Monreale, Italy : The Cloisters (late 12th century) (*left*)

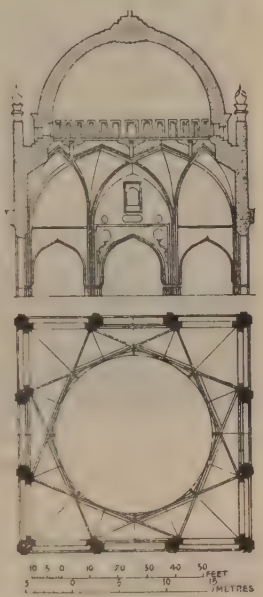
357 Mosque, Futtehpore Sikri
(late 16th century)

358 The Palace, Gwalior
(1486–1518)

359 Porch at Futtehpore Sikri (late 16th century)
(*above*)

360 Front of the Jumma Musjid at Ahmedabad
(15th century) (*left*)

squares intersecting each other, so that each rib of the vaulting intersects two other ribs in its course. This is, on a large scale, the same form of design which, as mentioned on page 183, occurs in the ceiling of the mihrab niche of the mosque at Cordova ; there it is a matter of design only, on a small scale ; here it is applied to construction on a large scale. The same principle of construction is carried out on a still larger scale in the tomb of Mahmoud, in which the idea apparently was to counteract the outward thrust of the dome by hanging the weight of the vault inwards. It is not a very consistent piece of design or construction, however, since the result to the eye is that the vault does not appear to carry the base of the dome to which it leads up, which is necessarily set a long way back from the opening formed by the termination of the vault. Both domes, of ogee outline externally, are weak in their constructive lines, and appear, in section, as if they must require a tie at the haunches, even though they carry no weight at the crown. Both the mosque and the tomb, however, are remarkable buildings, and represent Indo-Saracenic architecture entirely freed from Hindu influence.



361. Plan and Section of Vault under Dome, Jumma Musjid, Bijapur.

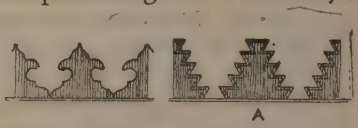
The Mohammedan architecture of the Turks, as illustrated in buildings erected at Brusa and Konieh in Asia Minor in the thirteenth century, during the rise of the Ottoman power, betrays, like the Indo-Saracenic work, Persian influence, in the employment of the Persian form of a nearly straight-lined pointed arch and the profusion of elaborate surface ornament, some of the remains at Konieh having a strong resemblance to the Saracenic arcade at Ajmir, already referred to, and built in the same century. In the Turkish work in Asia Minor we meet again with the device of parti-coloured voussoirs, cut into decorative shapes, in the arches of the doorways. But a change came over the Turkish ideal of mosque architecture after their taking of Constantinople in 1453, and the adaptation by the conquerors of the great church of Hagia Sophia as a mosque. It seems strange that while no Christian church-builders made any attempt to imitate or emulate that great building, or to adopt it as a model, the Turks appear to have been so much impressed by it that, from the date of their possession of it, the plan and design of their mosques was more or less influenced by the attempt to repeat or rival Hagia Sophia ; and while, in pure Mohammedan architecture, the dome had no place in connection with a mosque unless the mosque was also a tomb, after the taking of Constantinople the Turkish ideal of a mosque plan was that of a building with a central dome. The plan of the great mosque built by Suleiman the Magnificent at Constantinople, in the middle of the sixteenth century, is a close imitation of that

of Hagia Sophia, and even the exterior composition has a considerable resemblance to that of Justinian's church. There is a Byzantine touch, too, about the interior marble columns and arcades (374), only that the arches are pointed instead of round. It is the normal form of pointed arch, not the Persian form ; Hagia Sophia seems, in fact, to have fairly wiped out the Persian tradition. The mosque built by Sultan Ahmed, half a century later, follows the same idea, though in this the plan so far departs from that of Hagia Sophia that it is an equal square each way, with an apse and a semi-dome on each flank as well as at each end ; in fact, there is nothing to show which we are to regard as the main axis of the building ; a weakness in a plan where one end is supposed to be, ritually, the most important.

But, with whatever variations in detail, this scheme of the plan with a central dome became that of the Turkish form of mosque down to the present day ; a remarkable instance of influence exercised on the form of national places of worship by a single building originally erected for a perfectly different faith and ritual.

It remains to notice some minor characteristics of detail in Saracenic architecture, which, for convenience sake, have been passed over in the foregoing summary of the main architectural forms. One of these points is, the architectural importance given to doorways, in many instances, by the erection above them of a lofty and deeply recessed arch, within which is the actual door, of the size practically necessary, the lofty arch being the architectural expression of the doorway. The use of very elaborate interlacing geometric patterns (373), in inlay, in pierced work, or in relief, is a tolerably familiar characteristic, which to many people is the chief association with the word Saracenic. The development of this particular form of decoration may be traced to the religious prohibition of the representation of living forms of men or animals (a prohibition, however, not so strictly observed as is sometimes supposed), coupled with the fact of the essentially mathematical tendency of the Arab mind, which rendered these geometrical puzzles in ornament a congenial study. Complicated as many of these geometrical designs are, it will generally be found, on analysing them, that they can be reduced down to a comparatively simple basis of leading lines. The employment of what is sometimes called the stalactite vaulting or bracketing is another generally recognised feature of frequent recurrence, especially in comparatively late work. This is formed of a number of successive layers of small niches, starting from a series of brackets, each row projecting beyond the row below it (372). Like the geometric patterns, it is a structure complicated in appearance but reducible to a very simple principle ; the treatment in detail varies very much, but the principle is always the same. Its effect in execution is well shown in the photograph of the vault of a portal arch at Ispahan (of the seventeenth century) (366).

362. Doorhead with Parti-Coloured Voussoirs.

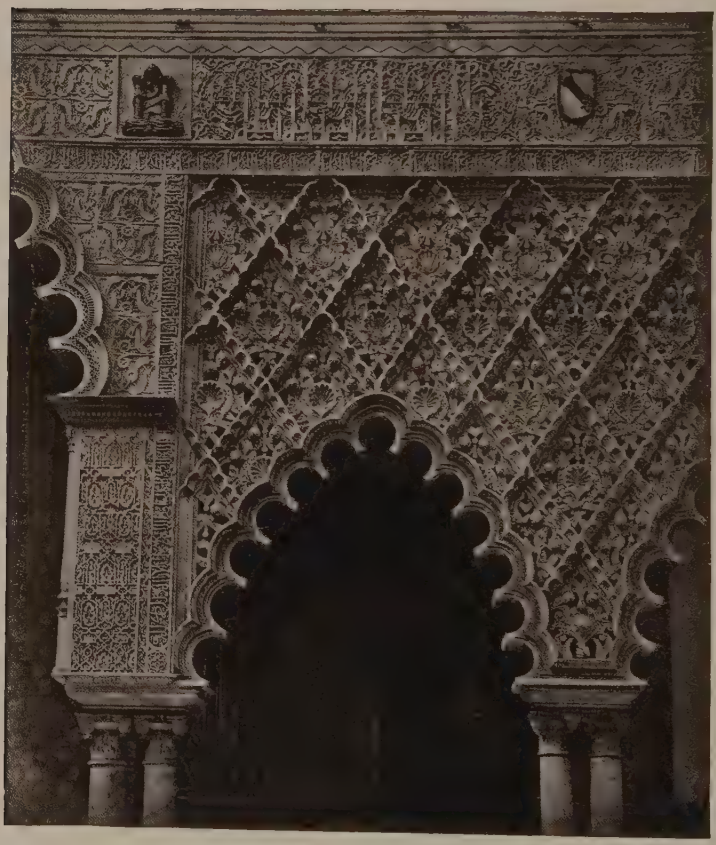


363. Ornamental Crestings.

364 The Taj Mahal at Agra (17th century)

365 Agra : A Colonnade in the Pearl Mosque (17th century) (*left*)

366 Stalactite Vault, Ispahan



367 Decoration from the Alcazar, Seville (early 13th century)

When executed in stone (which is not very often) it is only an outward modelling of successive oversailing courses of stone ; in a majority of cases, where it appears as a pendentive of a dome or as a bracketing system for passing from square to octagon in a minaret, it is really the plaster facing of a comparatively simple brick corbelling ; while in some of the chambers of the Alhambra it is nothing but a fictitious appendage of wood and plaster, with no structural function whatever. Another decorative feature is the use of masonry of contrasting colours, a most characteristic form of which is the formation of flat arches with the voussoirs cut into shapes which interlock (362). In some cases, however, where it has been possible to examine these interlocked lintel stones, it has been found that this cutting did not go through the arch, and was more of a face ornament than an actual construction. The prevalence of ornamental cresting (363) as a finish on the outer walls is also a note of Saracenic architecture ; there are many forms of these ; the most common and the most architectural in character (that marked A in the illustration) reminds one of the wall-crestings of the Assyrian palaces, only that the edges are oblique instead of vertical. The use of texts from the Koran, in lettering interwoven with the other lines of a decorative panel or spandrel (the Arabic characters lending themselves very well to such a use), is of common occurrence (367).

Besides the geometric ornament referred to above, there is in the Egyptian Saracenic buildings a great deal of most beautiful conventional floral ornament, or something approaching floral ornament, which is essentially Persian in type ; so much so that it would be difficult to differentiate it, as to school, from much of the ornament in Persian faience. The Arab conquerors could have found nothing in Egypt to inspire them with this kind of design. The geometric patterns were probably the evolution of their own genius ; the flowing patterns must have been borrowed from Persia, perhaps partly through the medium of Byzantine ornament, also influenced by Persia.

Such were the main characteristics of the Saracenic school of architecture ; a school which is strictly conterminous with the spread of the religion of Mohammed, and stands in the remarkable position, in architectural history, of having spread into various countries and produced a number of beautiful monuments, without having exerted an influence proportionate to the spread of its activity. Just as the Jews have remained a distinct people through all the phases of human history, Saracenic architecture remains a thing apart from all other phases of architectural history, preserving everywhere its own marked character, and, like the religion of which it is the expression, owning no community with anything outside its own limits ; for even the one instance of the influence of Hagia Sophia on Turkish building would never have occurred had not the building first been annexed as a mosque, and thereby become sanctified in the eyes of its new possessors.

A.D.	EVENTS IN GENERAL HISTORY.	ARABIA, PALESTINE, AND EGYPT.
600		
	Hegira of Mohammed (622).	
	Omar takes Jerusalem, and conquers in Syria, Egypt, and Persia.	Mosque of Amru, Cairo.
		Dome of the Rock, Jerusalem.
700	Saracen conquest of Carthage.	Mosque El Aksa, Jerusalem.
	Saracen conquest of Spain, and advance into India.	
	Moslem invasion of France defeated.	
	Mohammedan rule divided between Cordova and Bagdad.	
		Ibn-Touloun, Cairo.
800	Haroun-al-Rashid, Caliph at Bagdad.	
900	Mohammedans expelled from India.	
	Obeidalla founds Fatimite dynasty at Tunis, and conquers North Africa.	
		Cairo (el Kahira) founded.
1000		
1100	Jerusalem taken by the Crusaders.	
	Saladin succeeds the Fatimite dynasty at Tunis, and	
1200	conquers Damascus and Syria.	
	Latin Crusaders take Constantinople.	
	Genghis Khan : Tartars dominant in Persia.	
	Saracens in Egypt conquered by the Mamelukes.	
	Palæologus takes Constantinople.	
1300		
	Rise of Ottoman Empire.	
	Tamerlane : conquers Persia and invades India.	Mosque of Sultan Hassan, Cairo.
1400		Mosque of Sultan Berquouq, Cairo.
	Turkomans dominant in Persia.	
	Constantinople taken by the Turks (1453).	
	Union of Castile and Aragon.	Mosque of Kaitbey, Cairo.
	Conquest of Granada : Moors expelled from	
1500	Spain.	
	Mamelukes in Egypt conquered by the Turks.	
	Mogul Empire in India founded.	
	Akbar, Mogul Emperor.	
1600		
	Shah Jehan.	
1700		
	Decline of Mogul Empire ; rise of Sikhs and Mahrattas.	

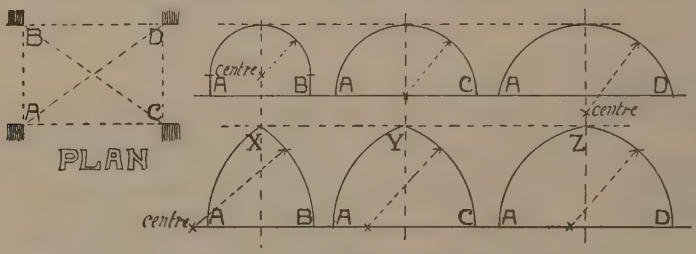
ARCHITECTURAL MONUMENTS.

North Africa and Spain.	Turkey, Asia Minor, and Syria.	Persia and India.
Mosque at Kerouan.		
Mosque at Cordova.	Great Mosque, Damascus.	
Cordova mosque enlarged and mihrab rebuilt.		
Giralda tower, Seville, and tower at Tlemçen. Mosque at Toledo.		Temple of Vimala Sah.
Alhambra commenced. Mosque at Tlemcen.		Colonnade of Kutub, Delhi (?). Mosque at Tabreez.
Alcazar, Seville. Court of Lions, Alhambra.		Domed tomb, Sultanieh.
		Jumma Musjid, Ahmedabad. Palace, Gwalior.
	Mosque of Selim, Constantinople. Mosque of Suleiman, Constantinople. Mosque of Ahmed, Constantinople.	Jumma Musjid, Bijapur. Mosque, Futtehpore Sikri. Tomb of Mahmoud, Bijapur. Taj Mahal, Agra.
	Mosque of Osman III, Constantinople.	

CHAPTER VI

THE GOTHIC PERIOD

At the close of the Romanesque period, where we quitted the subject at the end of Chapter IV, we had left the Romanesque architects at the point where in France generally, and in some instances in England, they had achieved the complete covering in of their churches with a solid cross-vaulted roof, but always with a certain amount of difficulty arising from the rigid and unadaptable character of the semicircular arch, when employed to bridge over, in the same vaulting construction, spaces of different width. Even in a square vaulting compartment, where the side arches and transverse arches are the same width, the diagonal arches must necessarily be wider ; in an oblong compartment, as in Fig. 368, we have arches of three different widths to work together, all to



368. Comparative use of Round and Pointed Arch in Vaulting.

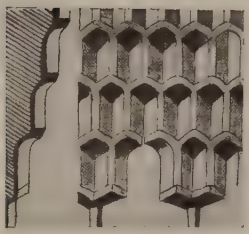
spring, in appearance, from the same level, that of the impost at the top of the vaulting shaft. Built as simple round arches, they must all rise to different heights. To make them work together into a cross-vault with a level apex, we should have, as shown in the upper part of the diagram, to stilt the wall arches A B and C D, to leave the transverse arches A C and B D semicircular, and to build the diagonal arches A D and B C as segmental arches, a method which involves a disagreeable twist in the line of the diagonal ribs (see page 147 *ante*). Otherwise, we may build A D and B C semicircular, and leave the vault as a series of partially domical compartments, the apex of each higher than the apex of the transverse arches which divide them. These and other methods of compromise were tried ; none of them produced satisfactory results. The substitution of the pointed arch first solved the problem in a satisfactory manner.

The French call the pointed arch the *arc brisé*, the " broken arch," a better nomenclature than ours, since it is more in accordance with the facts. The pointed arch should, in fact, be regarded as two segments of an arch butted against each other. It quite accords with this theory, and shows that it was thus that the pointed arch was originally regarded, that in true Gothic work

369 Batalha : From the South-East (1387–1415)

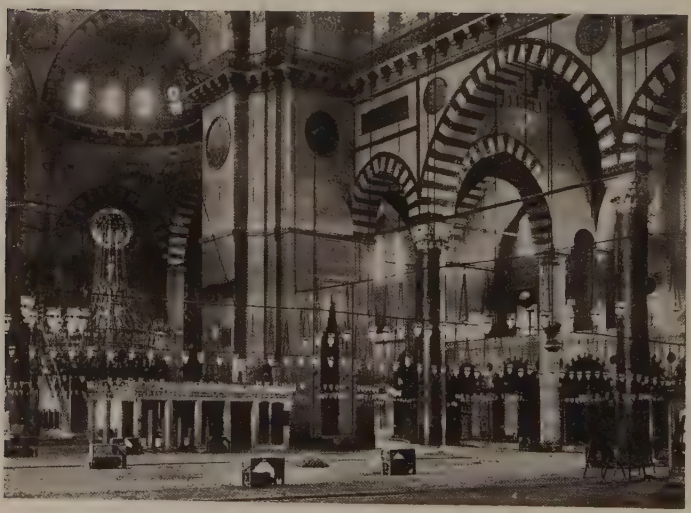
370 Burgos Cathedral : West Front. The Spires (1442–57) ; the Central Tower (1568 completed)

371 The Jumma Musjid, Bijapur (late 16th century)



372 Structure of Stalactite Work

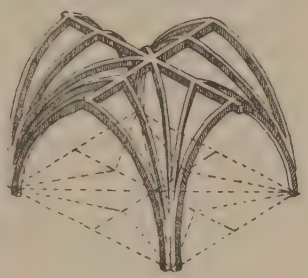
373 Panel in Door, Seville



374 Mosque of Suleiman, Constantinople (*c.* 1544)

keystones are unknown in the pointed arch ; there is a vertical joint at the apex. Structurally, a keystone, with the meeting of the arch mouldings at the top worked in it out of the solid, would be better building ; the fact that it was not adopted is a clear proof of the way in which the early users of the pointed arch regarded it. It represented such a segment of a complete arch as could most conveniently be worked into the lines of the vaulting. Recurring to our diagram of the vaulting space, we see that with the " broken arch " the intervals A B, A C, and A D could be spanned by arches all rising to the same level, and all starting from the impost, at angles so nearly similar at the starting-point as to render the whole a coherent and symmetrical design. The three half-arches A X, A Y, A Z, are different segments of different circles ; A Z is a segment nearly approaching (in arc measurement) a quarter-circle ; A X is a smaller segment of arc out of a larger circle.

In actual building, however, there were plenty of deviations from this theoretical way of stating it. The diagonal rib was occasionally struck from a centre below the impost ; the wall-rib was not infrequently stilted, *i.e.*, struck from a centre above the impost. But the important point to realise is that from the time of the introduction of the pointed arch in vaulting the vaulting-rib became, so to speak, *free*. In a vault formed by the intersection of two round-arched waggon-vaults, the lines formed by the transverse arches and the diagonal groin-ribs might have been represented as curves drawn on the inner surface of a continuous semicircular vault or tunnel. The diagonal ribs formed by the intersection of two pointed waggon-vaults would also be represented by curves drawn on the inner surface of a continuous pointed waggon-vault ; curves, all of which would be, so to speak, in the same curvilinear plane. But the pointed-arch vault was not, in fact, so carried out. Concurrently, it would seem, with the discovery of the practical utility and convenience of the pointed arch in the adjustment of the vaulting-curves, the mediæval builders seem to have ceased to regard the line of the diagonal ribs as produced by the inter-penetration of vaulting surfaces ; they forgot the vaulting surfaces and only considered the vaulting-ribs, the line of which settled the vaulting surfaces afterwards. Consequently, the curve of each vaulting-rib was what was thought of, and it did not follow that the transverse rib and diagonal rib should be in the same curvilinear plane ; it was sufficient if they started together at the impost and finished at the ridge, which now became (in most cases) a level line instead of a domical one.



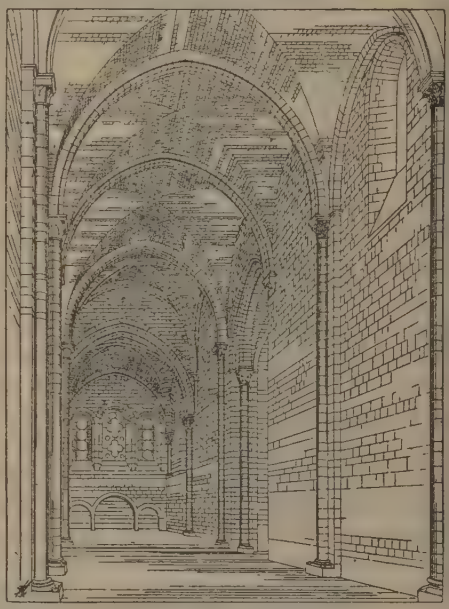
375.

Thus the vault now became a collection of arched ribs (375) starting from a common capital, and freely designed each in its appropriate curve, the shape and inclination of the vaulting surfaces being entirely determined by the line of the ribs, which formed the real structure. This dominating structural function of the vaulting-ribs was emphasised by the deep-cut and effective

376.
Sections of Vaulting-Ribs.

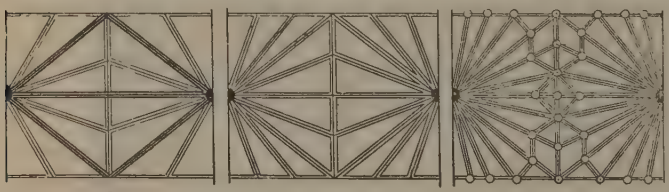
mouldings into which their section was shaped, giving added force and predominance to their lines. Examples of the English sections of vaulting-ribs are given in Fig. 376.

It will thus be seen that the theory of the vault had become exactly the reverse of what it was in Roman and in early Romanesque days. Then, the interpenetration of the vaulting surfaces settled—*made*, in fact, the line of the groins (with or without ribs); now, we find the ribs settle the shape and curve of the vaulting-spaces. Unless this change is realised, neither the spirit nor the subsequent history of Gothic vaulting can be understood. With this change came another important one. We have seen how each bay, in the Romanesque quadripartite vaulting, was separated from the adjoining bays by a massive transverse arch, so that the vault became a series of separate compartments of roofing, as may be seen even in cases where the pointed arch had already been introduced (377). But with the adoption of the pointed-arch vault and the predominance of the vaulting-rib over the vaulting surface, the transverse rib by degrees lost its special accentuation and became an ordinary moulded rib of the same section as the diagonal ribs, the vault becoming thus a continuous design instead of a series of separate compartments.



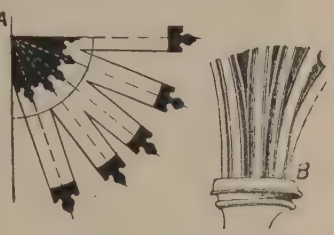
377. St Vincent, Senlis (12th century).

A certain difficulty of adjustment arose from the fact that the five ribs (one transverse rib, two wall-ribs, and two diagonals) had to be started from a capital on the vaulting-shaft not large enough to take their entire sectional area. In English vaulting this difficulty became accentuated by the introduction of intermediate ribs, as shown at A and B, Fig. 378, supporting the longitudinal and

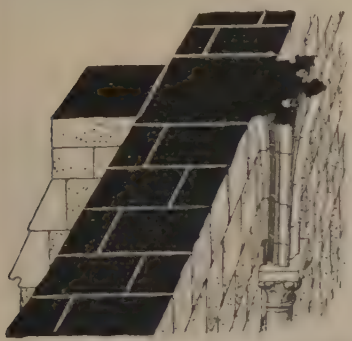


378. Plans of English Vaulting.
(The stronger lines in Diagram A are the original Diagonal Ribs of the simple Quadripartite Vault.)

transverse ridge-ribs at intermediate points. These ribs were not constructively necessary; they strengthened the vault a little, but they were added mainly for effect, the English builders having evidently become enamoured of the appearance of these groups of ribs branching out from one point. These intermediate ribs were hardly ever adopted by the French builders, who adhered generally to the simple quadripartite vault. But the English builders had now on their hands nine moulded ribs to spring from one cap, viz., two wall-ribs (which were necessary to complete the design, not for a structural purpose), four intermediate ribs, two main diagonal ribs, and one transverse rib; and to collect these (to appearance) on one capital it was necessary that the greater portion of their mouldings should be "mitred" and run into each other, leaving only the outer portion of the rib to come visibly down on the capital. The difficulty was increased by the fact that the ribs, having different curves and radiating at different angles (A, 379), separated from each other at different heights, as sketched at B, and there was often an attempt to conceal this irregularity of parting by starting the line of the diagonal rib, which had the most obtuse curve, a little back from the other ribs, so that it should not break off from them too soon. This is not much noticed from below (unless with a glass), and the general appearance satisfies the eye; but it was a make-shift method, such as would never have satisfied the Greek mind; and it was not reduced to correct logical treatment till the adoption of the fan-vault, in which all the ribs start from the capital at the same angle, and with the same curvature. The fan-vaults is an entirely English form, to be found in no other country; thus, as the English addition to the number of vaulting-ribs produced the dilemma, so the English builders provided, in time, the solution of it (to be explained later on).

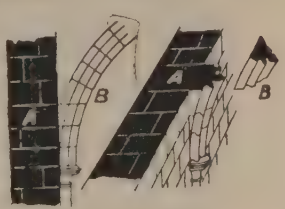


379. Parting of Vaulting-Ribs above Caps.



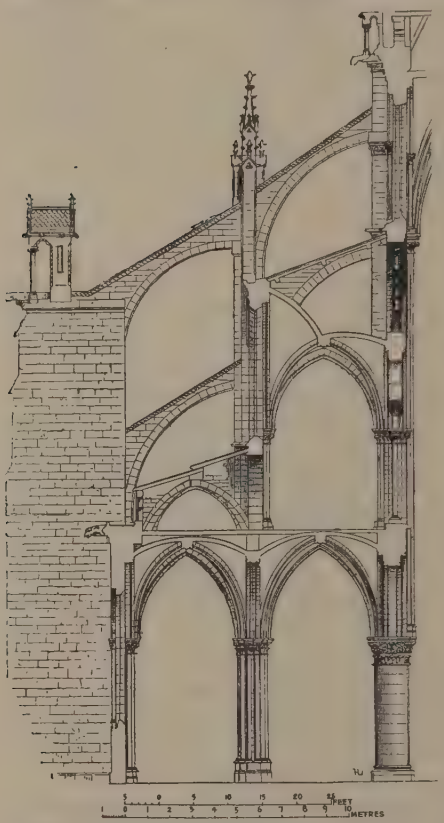
380. Springing of Vaulting-Ribs worked solid in the Walling.

In the case both of the French and English rib vaulting it is important to realise that the ribs do not spring as separate arches from the point where they appear to the eye to do so; their lower courses, as shown in Fig. 380, are worked out of a solid on the face of stones which are tailed into the wall with horizontal beds; thus, as shown in Fig. 381, the stones composing a vaulting-rib only become real



381.

arch-voussoirs after the rib has cleared these tailed-in courses of masonry. This method, which shows how truly the mediæval builders understood the nature of masonry construction, not only gives a much firmer abutment to the vaulting-ribs, but practically lessens the width of the space to be bridged over.



382. Buttress and Flying Buttresses of Notre Dame, Paris (late 12th century).

Note.—The outer wall of the aisle was subsequently advanced to the outer edge of the main buttresses, to form spaces for side chapels. See plan, Fig. 387.

If what the reader may think a rather disproportionate space, in a general history, has been devoted to a detail of construction, it is because the problem of the vaulting really governs the whole form and development of Gothic architecture. It caused the general adoption of the pointed arch; the great enlargement of the buttresses; the extensive introduction, in French Gothic especially, of flying buttresses; and it even influenced to a considerable extent the ground plan of the piers. Nor is this surprising, if we consider that the practical object of building is the covering in of a space, and that one of the first things to be thought of, in making the disposition of a plan, is how you are going to cover it in: the ground-floor masses must be laid out in preparation for that, both in respect of statical conditions and of architectural expression. Where, as in Egyptian, Greek, and Roman Temple architecture, the statical problem is a simple one—that of placing a rigid lintel or roof-beam on walls or columns on which it only exercises a vertical pressure—the problem of the plan is a simple one also. But the moment the arch, with its outward pressure, comes into play, the conditions are changed, and the substructure must have sufficient mass not only to carry weight but to resist oblique thrust. And when it comes to roofing a building with so delicate a structure as a network of arched ribs, and at the same time reducing the mass of wall as much as possible between the main points of support (in order to obtain more window space), we get to a condition of building in which stability depends entirely on a balance of pressures, and both the mass and the position of each pier in the walling must be carefully proportioned to the pressure it has to balance.

383 Interior looking East (1220–88)

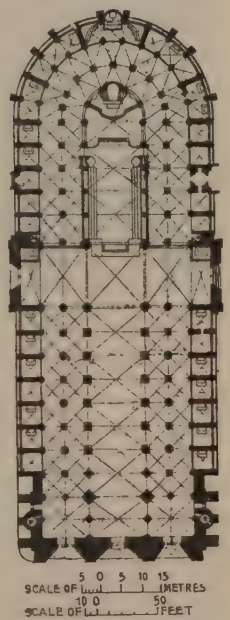
384 West Front (13th century)

385 Nave looking East

386 West Front

NOTRE DAME, PARIS (1163–1235)

Let us trace first the effect of these conditions on the buttress. The Romanesque builders, who in France had applied the forms of Classic columns and pilasters where they thought the wall wanted strengthening (especially at the angles of their polygonal apses), had begun to find out, even before the Gothic period set in, that these quasi-classic forms were unnecessary and out of place; that a mere projection of the wall was all that was wanted; and in Norman architecture in England, where Roman remains were much more scarce, the buttresses all take the form of projecting strips of wall, with no pretence of capitals. In England a perception that the line of pressure from the vault took an oblique direction downwards, led to the extension of the buttress in a series of projections appropriately made by sloping lines ("set-offs"); the canopy and finial were the decorative expression of the addition of material above the line of thrust of the vault, to weigh the buttress into greater stability. But in France, where the whole work was bolder and the centre vault carried to a much greater height than in England, pointed Gothic started almost at once on the employment of vast masses of exterior buttresses, standing like sentinels around the building, and taking the thrust, through the medium of flying buttresses, both of the centre vault and (where there were five aisles) of the vault of the inner aisle. The section of Notre Dame at Paris (382) is a good typical example of this arrangement. The building was commenced in the latter half of the twelfth century, and had at that time plain, rather wide and short pointed windows, which were subsequently (about 1240) altered, the clearstory windows much lengthened downwards (the window head retaining its position) and made into two-light windows by a shaft down the centre, the head being filled up with a circle; at the same time the ground floor windows were widened so as to open up the whole space between the buttresses, these windows becoming four-light windows with tracery of a geometrical pattern in the head. This last operation illustrates the radical change which had taken place in the placing and function of the masses of the walls. In a bay of a Romanesque church the windows would be comparatively small, leaving a considerable mass of wall between them with a buttress of small projection in its centre. In such a plan as that of Notre Dame (387) it will be seen that practically the wall-masses have been turned round so as to stand at right angles to the building, in order to act as efficient buttresses, and the wall between them becomes merely a screen pierced for windows, and having little relation to the real structure of the building. At Notre Dame the spaces between the buttresses were, about the middle of the thirteenth century, thrown into the interior as chapels, a



387. Plan of Notre Dame, Paris.

screen-wall being built connecting their outer faces ; an improvement to the interior effect at the expense of the exterior ; for there is something very imposing in these vast masses of external buttress in the French cathedrals, although it must be admitted that along with the flying buttresses, in two or sometimes three ranges, they produce an appearance of unrest, as if the building were propped up by a system of stone scaffolding ; a defect very obvious in a general view of the east end of Notre Dame. The effect is better on a near view, in detail, than at a distance ; seen as foreground (390), it gives a grand effect of complicated perspective of masonry construction. In the later English Gothic the wall-space between the buttresses became equally a mere space to be pierced with windows ; but the English builders were later in arriving at this point, nor did they, with their lower vaults and more timid construction, ever rival, or require, the vast mass of the French buttresses ; only in Westminster Abbey, built obviously under French influence, may something of the same effect be seen on the south side, where the great main buttresses project outside of the north cloister walk, which runs under the flying buttresses.

Notre Dame, though a very grand example of early French Gothic, still retains a little of the quasi-classic reminiscences of the Romanesque period ; it has the sexpartite vault over the nave, one compartment to two of the side aisles, but without any alternate treatment of the piers, which are formed of great built-up cylindrical columns with carved capitals with square abaci ; the vaulting-shaft starting from a base of its own on the abacus of the pier. The interior of Rouen cathedral (389) shows the same type of arrangement, with the quasi-classic cylindrical column ; in this instance the abacus of the capital is also circular ; in French work it is more usually square. In England the cylindrical single-shaft column, on a large scale, is generally the sign of Romanesque work ; in English Gothic a single column as a pier is only met with in comparatively small parish churches which were never intended to be vaulted ; in such buildings of late date it often alternates with an octagonal column. In France the classic reminiscence was stronger and lasted longer, as we see especially in the persistence till quite a late period of the capital with a square abacus and with foliage more or less founded on that of the Corinthian capital, while in English Gothic the circular abacus was adopted at an early period in the style and seldom departed from. And the very carefully balanced and severe design of the façade of Notre Dame (386), with its two well-placed arcades stretching horizontally across the façade, binding the whole together and dividing it into definitely marked stories, belongs rather to Romanesque than to complete Gothic feeling. The essential character of complete Gothic lies in freedom of development on vertical lines.

Hence, for a perfectly typical example of the fully-developed French Gothic we should go rather to Rheims and Amiens, both a little later, being commenced in the earlier half of the thirteenth century. Rheims is the more complete example, as in the west front of Amiens the two towers are not complete, and, moreover, are too small in area to dominate fully the rest of the design ; whereas Rheims (392), like Notre Dame, has the fine arrangement of two large western towers, concealing the ends of the aisles, which is the typical

388 La Sainte Chapelle, Paris (13th century)

389 Rouen Cathedral Choir, looking West (early 13th century)

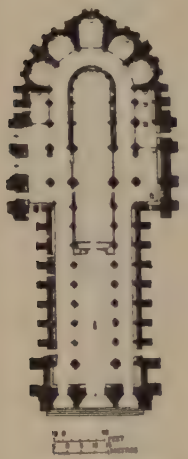
390 Buttresses, East End of Notre Dame, Paris (late 13th century)

391 West Front, Chartres (12th–13th century); North Spire, early 16th century

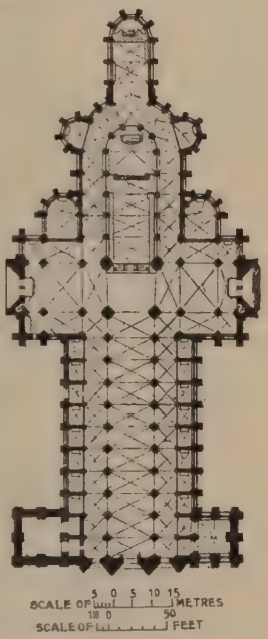
392 West Front, Rheims (13th century)

393 Le Mans Cathedral from South-East, showing Chevet Chapels (13th century)

French cathedral façade, and in the Gothic period was only fully realised in England at York and (on a smaller scale) at Lichfield ; the late western towers of Canterbury are poor affairs and not worthy of the scale of the building. The façade of Rheims has a good deal of general resemblance, in idea and proportion, to that of Notre Dame ; but while the latter is like Gothic in leading strings, Rheims is Gothic set free ; there is a romantic and soaring character about it not found in the Paris façade. Internally, the true Gothic development of the column into a collection of shafts, each fulfilling its own function in the design, is not perfectly carried out ; it is to the interior of Amiens that we must turn to see how the pier has assumed the multiple character proper to Gothic ; no longer a single column, but a column with four shafts attached round it, one of which goes up from the floor to the springing of the vault, as a vaulting-shaft, accompanied by two smaller ones springing from the capital of the nave arcade. In both cathedrals the vault is the simple quadripartite vault which the French, throughout the Gothic period, preferred to any more elaborate vaulting design. The great exterior buttresses are treated in a more decorative manner than at Paris ; the upper portions relieved with shafts and panelling, and crowned with a large decorated pinnacle ; but there is no recognisable practice as to this in French Gothic ; in some later buildings these buttress erections are left as nearly plain masses of masonry. The plan of Rheims (394), too, illustrates better than that of Notre Dame the great development which had taken place in the plan of the east end of a great church since the Romanesque period. Throughout the history of the Christian Church the architectural importance of the east end had continually increased, *pari passu*, we may suppose, with its ritual importance. The Latin Church began with a small apse ; the late Romanesque builders widened the apse and carried an aisle round it, and extended the choir by a bay or two longitudinally. The plan of Rouen (395) still preserves some of the characteristics of the Romanesque plan, in the narrowing at the east end, and the eastern apsidal chapels to the transepts. But here at Rheims we see that the whole plan spreads out after the east end of the nave is passed ; the choir extends to the whole width across the transepts ; and this same spacious extension of the plan eastwards

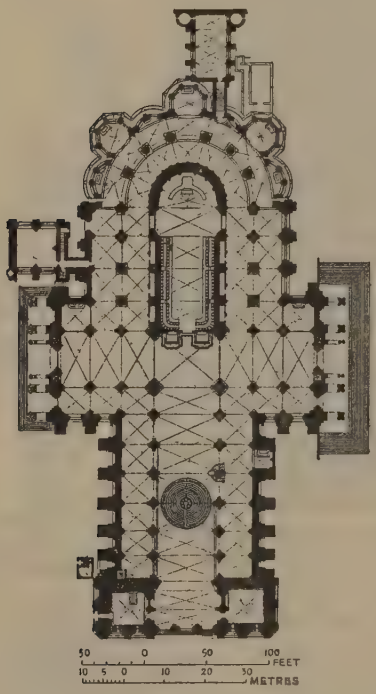


394. Plan of Rheims.

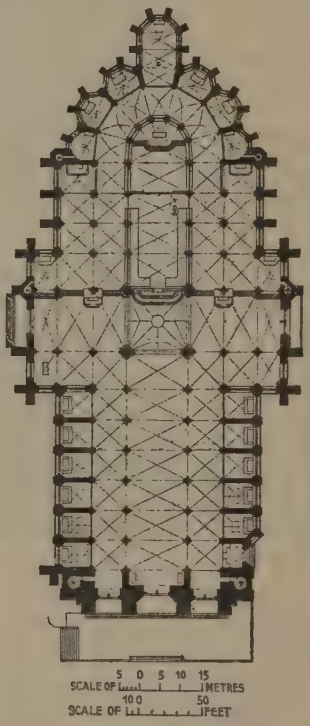


395. Plan of Rouen Cathedral.

is seen again in the plans of Chartres (396) and Amiens ; at Amiens (397) the outer walls of the choir appear at first sight to continue those of the nave, but it is not so in effect ; the outer ranges of chapels of the nave are really the spaces between the buttresses which, as at Notre Dame, are enclosed within the church ; in the choir the buttresses are outside and the outer aisles entirely open. This effect of climax, by the widening of the church at the choir end, is an essentially French characteristic, and is one of the greatest testimonies



396. Plan of Chartres.

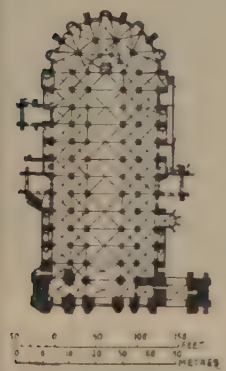


397. Plan of Amiens.

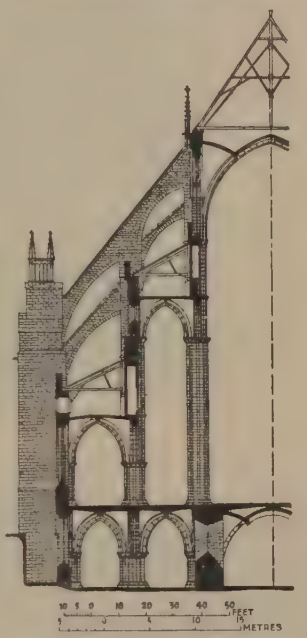
to the architectural genius of the French mediæval architects. There is nothing like it in the English cathedral plans, except at Westminster, which, as already observed, was built under French influence.

To describe at all in detail the leading buildings of the great period of French mediæval architecture would of course be far beyond our limits here ; we can only name a few of the most important, keeping for the present to those not later than the thirteenth century. The abbey church of St Denis, in what are now the outskirts of Paris, seems to have been the first in which the use of pointed arch vaults with freely designed ribs is recorded in the first part of the twelfth century ; the choir and the façade remain, the nave is a later building interpolated between them. Among the early churches of the Gothic period, that of Le Mans, though employing the pointed rib vault,

still retains in the nave the heavy transverse arch dividing the vaulting compartments. The choir, added in the thirteenth century, is remarkable for its great extension in width. Sens, commenced in 1140, is a fine example of a pointed vault church still retaining in its substructure the plain massiveness of character of Romanesque building, and the alternating treatment of piers, every other one being a large and massive compound pier, the intermediate ones consisting of coupled columns; here also the heavy transverse arch is retained, and the sexpartite vault, answering logically to the alternating piers, a small vaulting-shaft being carried up from the cap of the lesser (columnar) piers to start the secondary transverse rib of the sexpartite vault. Chartres (391), commenced very early in the style (the lower portion of the façade being almost Romanesque in its simplicity), is remarkable for the fine south spire, admirably connected with the substructure, and for the unique design of its flying buttresses with their radiating arcade, a detail more Romanesque than Gothic in feeling. Two other early cathedrals, Laon and Coutances, in which a great deal of Romanesque feeling still lingers, are especially noteworthy for the effective grouping of their towers and spires, Coutances also (462), for the fact that it shows, what afterwards became a rare incident in French cathedral architecture, an important central tower over the crossing. This feature, so important in English Gothic, was in fact rendered difficult and dangerous of achievement in French Gothic from the great height to which the vaults were carried; something had to be given up in exterior effect for the sake of interior height. Amiens and the choir of Beauvais are the most remarkable examples of this soaring quality of French Gothic interiors; Amiens carried to an internal height of 140 feet, Beauvais choir to over 160 feet; but the vault of Beauvais fell in shortly after its erection, and had to be rebuilt and the substructure strengthened by the addition of extra piers between the original ones; a subsequent attempt to erect a spire over the crossing (after the transepts had been added) led to a fresh catastrophe; and though Amiens (384) managed to retain the spire over the crossing, it is not large and important enough, comparatively speaking, to dominate the immense mass of roofing over the vault. Rouen, remarkable for the lofty proportion



398. Plan of Bourges.



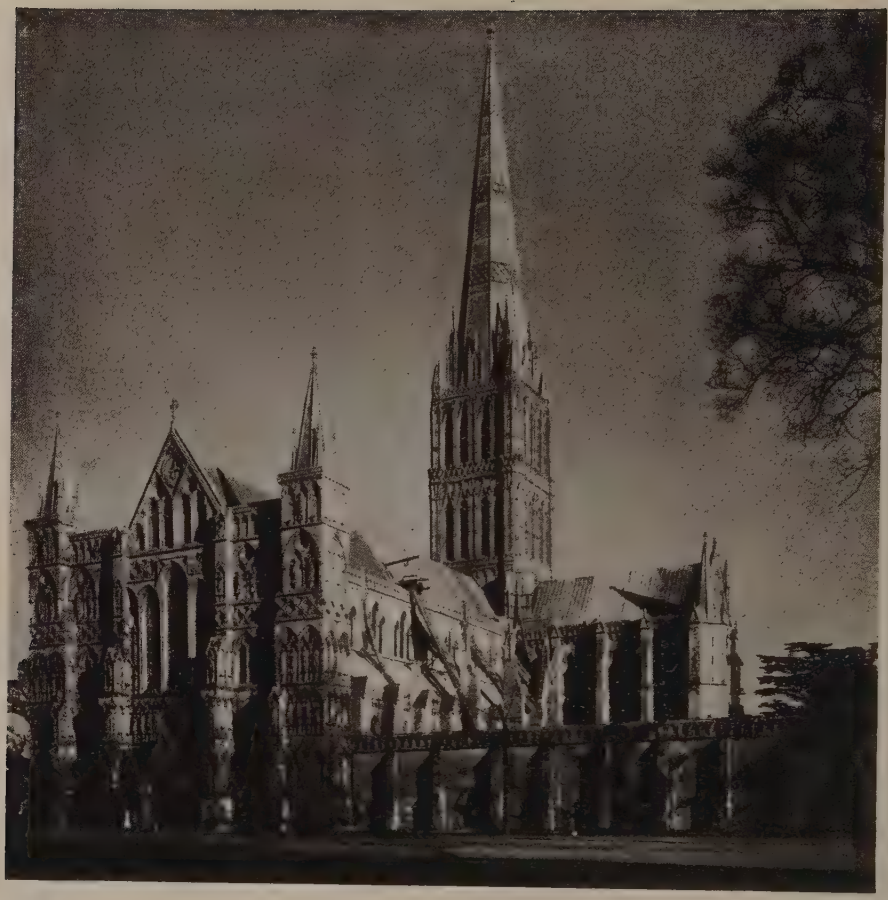
399. Half-Section of Bourges (13th century).

of its aisles, was intended to have a central tower, which was never ventured on in stone ; a futile timber erection, which was destroyed (probably burned), was replaced in the last century by a lofty openwork cast-iron spire of execrable taste. The cathedrals of Bourges and Troyes, both five-aisled, differ from the prevalent thirteenth-century type of plan in having the choir a continuation of the same width as the nave ; at Bourges (398) the transept is entirely suppressed, and the plan with its semicircular east end, is that of a kind of glorified basilica ; here also is one of the exceptional instances of the retention of the sexpartite form of vault (one compartment of centre to two of aisles), the piers being alternated in mass to harmonise with the vault, with the odd result that while every alternate pier of the main arcade is a small one, the shorter piers, in the interior position between the two side aisles, are all on the larger scale of plan ; they ought logically to have followed the plan of the smaller piers of the main arcade. The section of Bourges (399) gives an impressive idea of the extent to which the French cathedrals owe their stability to an elaborate system of shoring up. The façades of the three last-mentioned cathedrals, which are of great richness and elaboration, belong to a later period of the style. On a smaller scale than Rheims and Amiens, the greatest perfection of French thirteenth-century Gothic is exhibited in the beautiful Sainte Chapelle at Paris (388) ; a small building in which the fine proportions of the geometrically traceried windows, the treatment of the canopies and buttresses, and the graceful spirelet or *flèche* in the centre of the roof-bridge, combine to produce a design completely satisfactory both in internal and external effect.

As the unit of classical architecture may be considered to consist in two columns and their entablature (the intercolumniation, or distance between two columns, being an important element), so the unit of Gothic architecture may be said to consist in the design of one bay of the nave or choir of a cathedral. As developed about the middle of the thirteenth century, this shows an architectural composition in three stories (see interior of Lincoln choir (400), and compare it with the interior of Amiens) ; the main arcade, with compound piers and moulded arches ; the " triforium " arcade (see fig. 407), running continuously along above the nave arcade ; and the clearstory, consisting now of a large window occupying the whole of the space between the wall-ribs of the vault, divided vertically by one, two, or three mullions, as the case may be, and the upper portion filled in with tracery of geometric design, in which the circle is the predominating form. A long wall-shaft, or it may be a triple shaft, rises either from the floor or from the capital of the nave pier, and has its own capital above from which spring, or appear to spring, the diverging ribs of the vault. The greatest difference between this and a similar compartment of a Romanesque cathedral lies first, of course, in the use throughout of the pointed arch ; secondly, in the much greater expanse of the clearstory window, which was made possible by the use of the pointed vault, and which was a most important improvement in the lighting of the interior, and in affording the opportunity for the display of stained glass, a beautiful art now beginning to come into use ; thirdly, in the partial filling

401 Interior, Beverley Minster (*above*)

400 Part of the Choir, Lincoln (1255–80) (*left*)

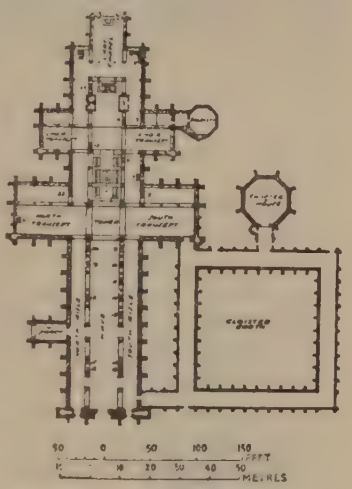


402 Salisbury Cathedral (*c.* 1245 : Spire and upper part of Tower *c.* 1300)

403 Salisbury : The Choir (13th century)

in of the aisle and clearstory windows with tracery, in place of the blank openings of the Romanesque period. The great architectural advantage of traceried windows (which had much more elaborate developments later in the style) is that, besides providing designs of beauty and interest in themselves, and especially suggestive for stained glass, they, in a sense, carry the wall-surface across the window space, and render the window a part of the architectural design though appearing as the structure. The treatment of the triforium varies most. Occasionally (though not often) it is only a line of wall-arcading ; generally it is an open arcade with a " practicable " passage in its rear, continued by narrow openings through the main piers ; sometimes with plain arches, sometimes with traceried ones, often carried on light coupled shafts which have a very graceful effect. The triforium arcade, in fact, is a portion of the design which, falling as it does between the real structural masses of the building, could be played with, according to the fancy of the architect.

The English cathedrals present a great many more differences of date, and consequently of style, in the same building, than the French cathedrals. In France there are a good many examples of cathedrals which, except perhaps for a façade of a later period, have been proceeded with continuously until completed, and consequently represent approximately the same style throughout. In England this is rare. Salisbury is the only English cathedral built in the same style throughout. At Lincoln the Early Decorated choir harmonises very well with the Early English nave and transepts, and seems like the same style treated with more richness as we approach the east end. But most of the English cathedrals exhibit breaks of style which, however interesting historically, destroy their architectural coherence. Thus at Norwich we have a Norman substructure with an elaborate late Gothic vault ; at Southwell a Norman nave leads to a thirteenth-century choir ; and so on.



404. Plan of Salisbury.

If we take an English cathedral plan all of the same period, such as Salisbury (404), which was entirely built in the thirteenth century, we see at once the great difference between that and such a typical French plan as Rheims. Salisbury is a little longer than Rheims, but it is much narrower, whereby its interior length appears still greater ; the choir end does not expand ; the east end is square, a characteristic of almost all English churches after the Romanesque period ; and the greater thickness of the crossing piers is much more marked than in the French plan, as it was always intended that the crossing arches should carry an important central tower, the dominant exterior feature of an English cathedral. The fine pyramidal composition of Salisbury (402),

dominated by the central tower and spire, may be instructively compared with that of Amiens (384), with its inadequate central spirelet. The double transept, though it occurs also at Lincoln and Canterbury, was not universally employed. The circular east end, as already observed, was retained as long as English cathedral building was done by Normans or under French influence ; as soon as a special English taste in architecture had developed the square east end was adopted ; beneath several Gothic choirs the semicircular basement wall of the Norman east end still exists. The reason for the English preference of the square east end has already been suggested (page 170).

If we compare the unit of English thirteenth-century Gothic with the unit of French Gothic—the single bay of nave or choir—we find much the same general features ; the ground floor arcade, the triforium, the clearstory are there in much the same general form ; the dimensions are lower ; the caps of the shafts are in almost all cases circular instead of square ; the arch-mouldings are, in general, finer and more elaborate than in French work. The interior of Salisbury (403) shows the general effect of the best English detail of the period. There is less grandeur than in the French Gothic, but there is more refinement of detail. The elevation of a bay of the late thirteenth-century choir of Lincoln (400) forms one of the most beautiful and refined pieces of architectural design on record of any age.

The chronological successions of style are more strongly marked and more numerous in English than in French Gothic ; or it may be put, perhaps, that there was more persistence of principle and less restlessness of taste among the French than among the English architects. English architecture had this gain, however, that it evolved two very complete and consistent phases of style, both very beautiful in their way, which are exclusively English, viz., those known as the " Early English " and the " Perpendicular " or " Tudor " styles. The attempt at a special nomenclature of the English styles, except in regard to the " Transitional " (transition from Romanesque to Gothic), has been based chiefly on the treatment of windows and window tracery ; not that these are really of more importance than other elements in the architecture, but they afford conspicuous and strongly marked features, the changes in which are easy of chronological definition. If we apply the same rule to French Gothic, we may state the two thus :—

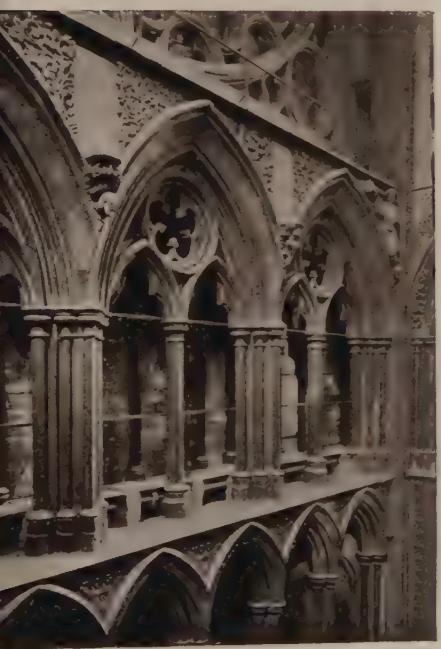
French.	Approximate Dates.
Transitional	1140–1220
Geometrical Decorated	1220–1400
Flamboyant Decorated	1400–1500

English.	Approximate Dates.
Transitional	1145–1190
Early English	1190–1245
Geometrical Decorated	1245–1315
Curvilinear Decorated	1315–1360
Perpendicular	1360–1550

In both cases the " Transitional " is the period in which the pointed arch has been adopted, but the general architecture still retains the plain massive

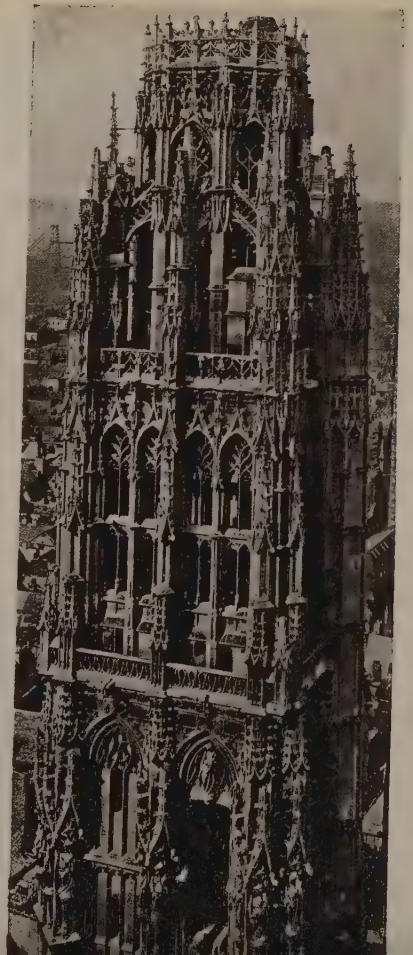
405 Window of Flamboyant Tracery, Beauvais (15th century)

406 Vault, Exeter (*c.* 1350)



407 Triforium, Westminster (13th century)

408 Central Tower, Canterbury

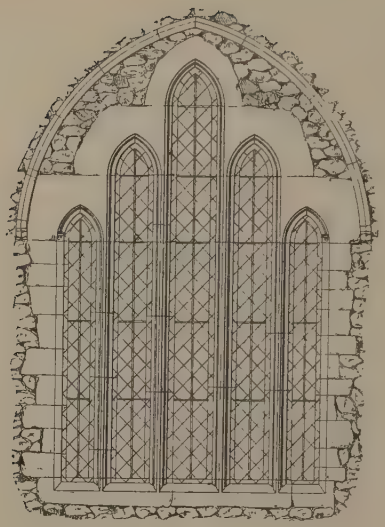


410 West Porch, St Maclou, Rouen (French 15th-century Detail)

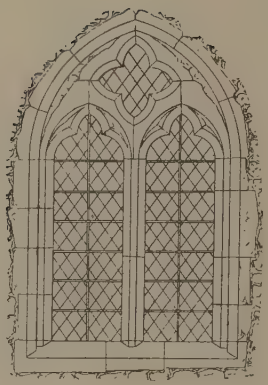
character and much of the type of mouldings and decoration of the Romanesque, and there is no tracery in the windows. In both cases " Geometrical Decorated " (a term which characterises French Gothic of the thirteenth century just as well as English, though it has not usually been applied to it) is a more advanced and decorative style in which the windows are filled with tracery based on geometrical patterns. Both in French and English Gothic the idea of window tracery seems to have arisen from the attempt to fill the space above pointed lights by circular openings. From this, as will be seen from the illustration (411, 412), it was an easy and natural step to join the openings into one design, running the mouldings together. But French Gothic, as a rule, went straight to this from the Transitional style, filling their early form of wide, empty pointed window with tracery ; English Gothic, before coming to the tracery, developed an intermediate phase of singular beauty, known as " Early English," in which the plain pointed window was reduced to very narrow proportions and often grouped in twos and threes (in a set of five in a famous window in the transept of York), assisting the vertical expression of the architecture and getting rid of the bald effect of the large blank window of the French Transitional period. (See illustration of Coutances (462).) The severe but graceful simplicity of this style is accompanied by a fine and restrained school of carved ornament, and by a form of uncarved moulded capital, often of a refinement of sectional line reminding us of Greek mouldings ; this capital is a detail peculiar to English architecture, and found nowhere else in the world. The Early English style has no parallel in French Gothic taken as a whole ; something like it appears in isolated instances, as in the apse of Bayeux, but it was never worked out into a complete and consistent style, as in England.

The late French " Flamboyant " style is named from the flame-like shape of the tracery designs, the most beautiful style of window tracery ever developed (405 and 410) ; almost oriental in its richness of effect, it has the merit of being designed nevertheless on a perfectly symmetrical geometric basis. This form of tracery is peculiar to France, and is one of the finest details evolved in French Gothic, though it is probably based on English Curvilinear tracery ; indeed, it is a question whether the French did not owe the whole idea of window tracery to England. The Flamboyant style is accompanied by a greatly increased general richness of ornamentation, especially externally, but there is less change in the main structural lines of the architecture than in late English Gothic ; at St Ouen at Rouen, for instance, one of the finest and most elaborate buildings of the Flamboyant era, we still find internally the simple quadripartite vault, springing from a plain vaulting-shaft, much as it would have been a couple of centuries earlier.

In England it was very different. The late Decorated or Curvilinear period in England is named from the more free and branching character of the window tracery, but with this come many other decisive changes :—a greater general richness of treatment combined with a change in the character of the mouldings and the carved work, the latter becoming richer but less architectonic and more naturalistic in style ; a more ornate treatment given to buttresses ; but most of all a great elaboration of vaulting design, by the



A



B

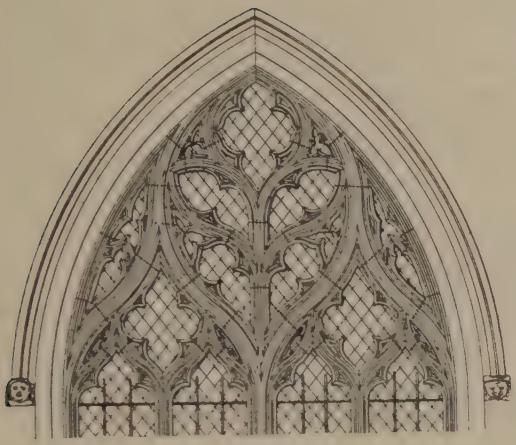
C

D

E

411. Development of English Window Tracery.

A. Typical Early English Window (Oundle, Northamptonshire).
B. Early Stage of "Plate Tracery"; Openings cut through without attempting continuous moulded bars (Lindfield, Sussex).
C. and D. A Step in Advance (Raydon, Suffolk).
E. Geometrical Decorated; fully developed tracery (Meopham, Kent).



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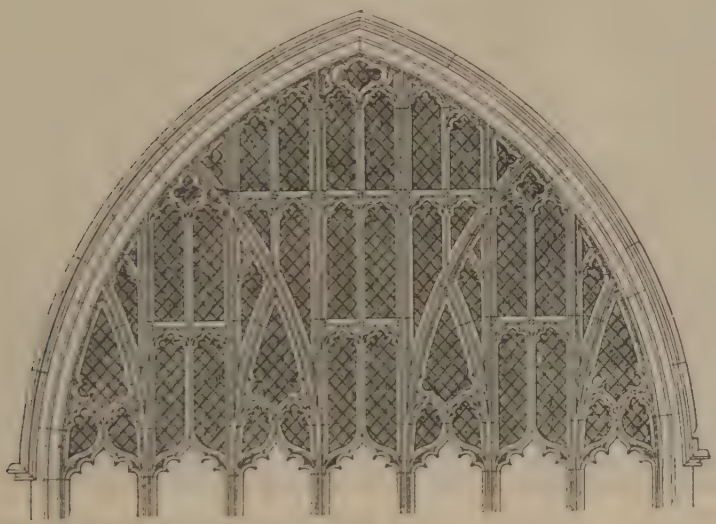

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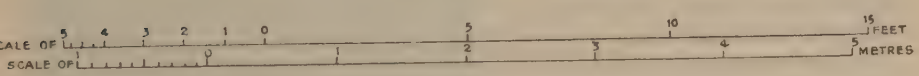
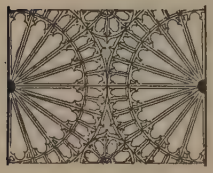


412. Development of English Window Tracery.

F. Curvilinear Decorated (Sleaford, Lincolnshire).
G. Perpendicular Style (Coggeshall, Essex).

introduction of additional ribs of construction, as well as others which may be regarded as merely surface ribs, so that the vault, as seen from below, assumes a very rich and decorative effect. We may trace the successive steps in the plain quadripartite vault of Beverley (401) ; that of Exeter with a multiplication of constructional vaulting-ribs (406) ; and that of Canterbury (414) with its assemblage of merely decorative ribs forming a pattern on the vault. It was this multiplication of vaulting-ribs which evidently suggested the last and most notable alteration in Gothic vaulting, the introduction of the fan-vault. Mention has already been made (page 195) of the practical difficulty of combining vaulting-ribs of different curvatures in their start from the capital. In the plan of vault given at C, Fig. 378 (page 196 *ante*), it will be seen that the bounding line of the assemblage of ribs radiating off each capital approaches rather near to a half-circle ; the final step was to make it a complete half-circle, with all the ribs of the same length and the same curvature, and each making the same angle with the next one. (Fig. 413 shows the plan of a fan-vault, and Fig. 415 its appearance to the eye.) Thus at last the problem of starting the ribs symmetrically from the capital was solved, but with the curious accompanying result that it now became more easy to build the vaulting surface in solid masonry and work the ribs on the surface of it, than to build the ribs first and fill in the spaces. The fan-vault became, in fact, a bracketing-out in the form of an inverted conoid, meeting the thrust of the contiguous and opposite conoids, holding up between them the horizontal spandrel masonry. Thus the vault, which with the Romans and early Romanesques consisted of interpenetrating surfaces, and became in the later Romanesque and Gothic work a structure of arched ribs holding up the intermediate surfaces, is now again a construction in which the surfaces are the dominating factor, and the ribs merely a means of expression.



413.
Plan of a Fan-Vault.

This culminating form of vault, found only in England, is the rich form of roofing of the Perpendicular style, so named from the fact that in the tracery of the windows the main curved lines had been abandoned, and the window openings, which now attained their greatest area, were filled up with vertical mullions (as the uprights in window tracery are called), the spaces divided up by cross-bars (transoms) into a number of upright panels with foliated heads (see G, Fig. 412). This panel arrangement ran also very much through the whole wall-surface treatment of a Perpendicular church, as may be seen in the west front of York, Fig. 423. In many points of detail the Perpendicular is a style of decadence ; the mouldings become thin and wiry in character, with the interposition of large shallow hollows, often partially filled with repeating ornament of square-cut rosettes at regular intervals ; the floral carving has lost all the broad and bold conventional character of earlier work, and dropped into a weak formalism. Yet the Perpendicular style has some very fine qualities of its own, when we look at general effect rather than detail. If we miss in it the bold mouldings and broad wall surfaces of early

414 Canterbury : Nave looking East (1391–1405) (*above*)

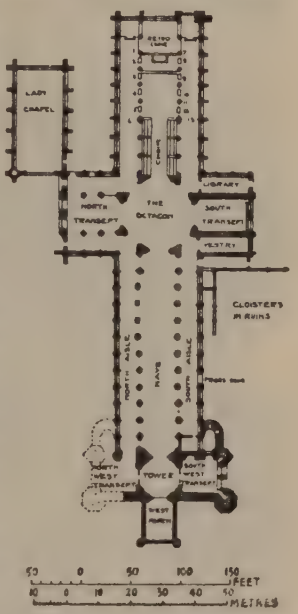
415 Fan-Vault, Gloucester (1381–1412) (*left*)

416 Ely, from the South-East, showing 14th-century Central Octagon (*above*)

417 Ely : West Front (late 12th century) (*left*)

Gothic, there is in the finest Perpendicular work a rich stateliness of effect which has its own value ; and Henry VII's chapel at Westminster, in which all the possible richness of detail of the style is worked out to its highest result, is in its own way one of the most beautiful and perfect productions of architecture.

Salisbury has been already referred to as the most complete example of the Early English style ; remarkable also for its noble centre tower and spire of the Decorated period ; the latter not erected without danger to the substructure, the arcades of which have been crushed out of perpendicular by its weight. Of other monuments in the same style may be mentioned Beverley Minster ; the transepts of York ; the nave and west front of Wells (432), remarkable and quite exceptional in England for the profusion of the sculptural decoration of the façade ; the west front of Peterborough (433), with its three great arches, which, as an architectural conception, may be said to be the finest façade possessed by any Gothic cathedral in the world ; and the nave of Westminster (Early English just verging on Decorated), the exterior of which has been too much restored to be worth much as an example, but the interior is one of the finest productions of the style. Early Decorated work shows beautifully in the west front of Lichfield (429), a cathedral remarkable for the fine grouping of its three spires, and in the eastern portion and the three towers of Lincoln, also a most successful architectural composition. Late Decorated is well illustrated in the greater portion of Exeter Cathedral, which has, after Salisbury, the nearest approach to unity of style ; also in the Lady Chapel of Ely. Early Perpendicular (before the development of the fan-vault) is shown on a grand scale in the nave of Winchester, a casing of later work on a Norman core ; and one of its finest monuments is the central tower of Canterbury (408) ; the nave, of the same date, is but poor work. The latest Perpendicular, that with the fan vaulting, is illustrated to perfection in Henry VII's chapel, already mentioned, and in King's College chapel at Cambridge.



418. Plan of Ely.

Ely Cathedral, though a great portion of it belongs to the Romanesque period (416), merits special mention here on account of the fine treatment of the crossing, carried out in the fourteenth century, whereby the usual restricted square space under the tower, which Fergusson rightly describes as the weak point of the mediæval cathedral plan, is expanded into an octagon (see plan, 418), crowned by an octagon lantern externally. Unfortunately the builders had not the courage, or the science, to attempt vaulting it in stone ;

both vault and lantern are of timber ; but it is a notable design, unique in mediæval cathedral architecture.

In connection with several of the English cathedrals—Westminster, York, Lincoln, Worcester, Wells, Salisbury, and Southwell—the octagonal chapter-house is an architectural feature of great beauty, and (like some others that have been mentioned) peculiar to England. In most of these the octagonal building is vaulted from a central pier, the vaulting-ribs radiating from it—perhaps the best effect that can be seen in the employment of this system of roofing. Another point not to be overlooked in connection with English Gothic is the existence of a large number of parish churches of average size, which are of great architectural beauty, and in some of which, in fact, some of the best examples of Gothic detail are to be found, as well as excellence and refinement of general design. In France, Gothic architecture is illustrated mainly by cathedrals, or by churches of such size and importance as to be almost like lesser cathedrals ; in England equally fine work, on a smaller scale, is to be found in the parish churches. The counties of Lincoln and Northampton are especially remarkable for the number of good churches of the earlier Gothic periods, and those of Norfolk, Suffolk, and Somerset for those of the later period (420, 421). Somersetshire is especially noteworthy for its fine towers, which form almost a class by themselves ; Lincoln and Northampton for their spires ; some of these spires furnish examples of the fine effect to be obtained by the simply designed spire, in which the transition from the square tower to the octagon spire is made by means of a buttress-like mass, triangular on plan, springing from the four angles of the tower, and diminishing to a point against the face of the spire ; a simple combination of lines which produces a most happy effect of pyramidal composition. We are indebted also to the English parish churches for another most interesting feature—the decoratively designed open timber roof. The timber roofs over the vaults of the cathedrals are often fine examples of mediæval carpentry, both in England and France, but they are not seen and are purely structural. The English parish churches were hardly ever vaulted, and their open timber roofs became an important architectural feature. The roofs of the Early English and Geometrical period depend for their effect chiefly on the lines of the structure and on the mouldings of the heavier timbers. At a later period the hammer-beam roof was introduced, a rather unscientific but very picturesque construction, capable of very

419. Hammer-beam Roof, Bacton Church, Suffolk.

420 St John's, Glastonbury, Somerset (late 15th century)

421 Lavenham Church, Suffolk (1485–1525)

422 Lincoln : From the South-West (13th–14th century) (*above*)

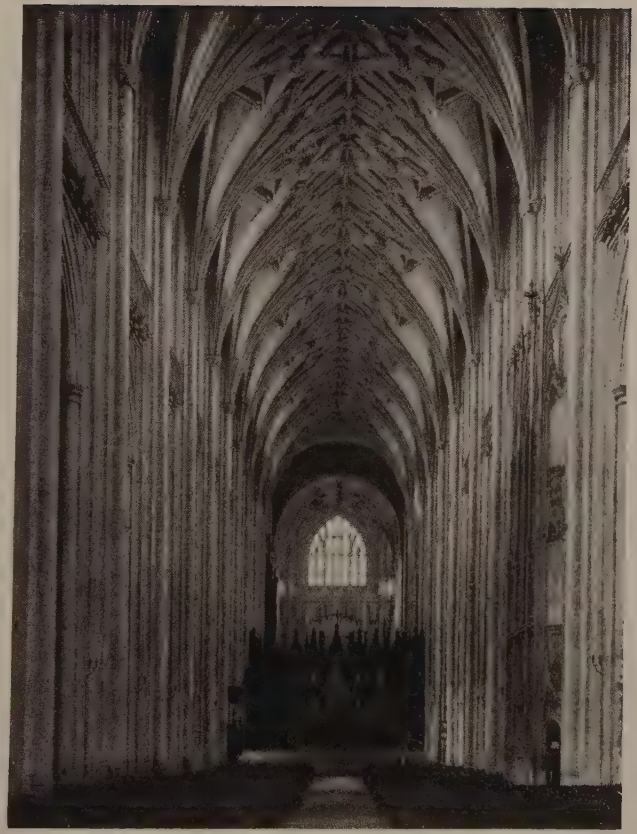
423 York : From the South-West (Front *c.* 1330) (*top left*)

424 French Western Doorways (Amiens) (*left*)

425 Late French Detail: Brou-en-Bresse (1511–36)

426 English Western Doorway, Lichfield (early 14th century)

427 Decorative Arcade in the Chapter-House, Southwell (*c.* 1300)



428 Nave, Winchester Cathedral (15th century)

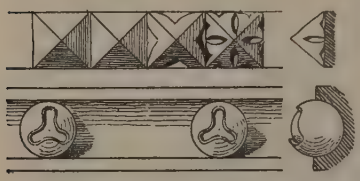
429 West Front, Lichfield (early 14th century)

decorative treatment by means of carving and of pierced open-work panels (419). At Knapton, in Norfolk, an average-sized parish church, the three tiers of brackets of the hammer-beam roof are each decorated with a large carved figure of an angel with outspread wings ; and though the execution of these figures is naïve enough in detail, their effect when the roof was in its original blaze of colour and gilding must have been, for its scale, very fine. The great example of the hammer-beam roof is the celebrated one which spans the wide space of Westminster Hall.

Of the late French (Flamboyant) Gothic two of the finest examples are the centre lantern of St Ouen at Rouen, and the church of St Maclou in the same city (410) ; another is one of the towers (409) of the cathedral. The lace-like west front of Troyes forms another rich and characteristic example of late work ; also the jubé or screen in the same church. As the style approached its decline we find, both in French and English Gothic, a tendency to do away with or weaken the impost both of the main arcade and of the vaulting-ribs ; thus in the English Perpendicular the mouldings of the piers are sometimes continued as the arch-mouldings, either without a break or (more commonly) with only one small capital to a single member of the pier-mouldings ; and at Auch, one of the latest of the French Gothic churches, near the close of the fifteenth century, the arch-mouldings die against a circular pier, without any capital, and the vaulting-ribs, in a similar manner, spring from a projection in the wall without a capital. A feature to be noted in French Gothic is the frequent introduction of large circular traceried windows ; in the earlier period with the tracery in a wheel form with geometrical patterns at the extremity ; in the later Gothic with a rich and closely woven Flamboyant tracery of exquisite beauty. There are some fine circular traceried windows in England ; one, for instance, in the south transept at Lincoln ; but there is nothing to equal the beauty of the Flamboyant circular windows.

Gothic carved ornament is very varied, and much of it very beautiful, especially during the earlier periods of the style, when it was all the more effective through being used with reticence. The French carved capitals were obviously inspired to a great extent by the Corinthian capital, of which there must have been many examples left among the Roman remains in France ; but it is the general outline of the Corinthian capital, treated in a new and a broader and simpler manner, partly influenced no doubt by the difference of the material—stone instead of marble. The running carved ornament in early French work shows a very clean definition of line, and the manner in which figures or animals are worked into it shows considerable trace of Byzantine influence. In England the Classic form of capital had much less influence, and in the Early English period a form of what may be called stone vegetation was adopted which, as a suggestion of growth with no realistic imitation, is one of the best types of carved ornament in architecture. This form is found in French capitals, often as a substitute for the Classical angle volute, but is most completely and systematically employed in Early English work ; it has the merit of appearing to develop from the bell of the capital, and to give support to the abacus, whereas the caps in the Decorated period have carved foliage

which appears to be applied to or wrapped round the bell of the cap instead of developing from it. Some of the English semi-naturalistic foliage of the Decorated period, such as we see at Southwell (427), is beautiful work in its way, but much less architectonic than earlier work. The carved boss at the intersection of the vaulting-ribs, Westminster, is a good example of the best period of English ornament. It should be noted that these decorative bosses at the intersection of vaulting-ribs are not introduced from a mere arbitrary desire for ornament; they are to get over the difficulty of making a neat junction of the mouldings of the four ribs; in this, as in so many instances in Gothic architecture, a practical difficulty is solved in a decorative manner. Two forms of repeating ornament, the "dog-tooth" and the "ball-flower," are especially characteristic respectively of the Early English and English Decorated styles (430). The former had the advantage of being very easy to execute; it is only necessary to cut out a succession of small pyramids and then cut them in the centre of each face to give an approximate leaf form. The ball-flower, evidently the happy hit of some individual carver, is a clever conception in floral conventionalism. The use of very flat square leafage forms as a wall-diaper is well illustrated in the spandrels of the arcades in Westminster Abbey. The "crocket," a repeating leafage form on the angles of pinnacles and on gables, is of constant use in both French and English architecture, where it serves admirably to modify the hardness of the sloping line; see the arcade from Southwell (427). The English crockets of the early Decorated period, with their crisp character, are excellent examples of the conventional suggestion of floral forms in stone.



430. Dog-Tooth and Ball-Flower Ornaments.

A comparison of the respective merits of French and English Gothic is a matter of some critical interest, the rather that it has seldom been attempted in a really fair and impartial spirit. In the high tide of the Gothic revival in England (a movement which, it must be remembered, had little reflection on the other side of the Channel) the attention of the revivalists was almost entirely occupied by English Gothic and the desire to make it over again; Burges was the only important revival architect whose sympathies, as well as the style of his buildings, were distinctly French. Of late years there has been a reactionary tendency to exalt French Gothic at the expense of English.

French Gothic is the fountain-head of the style; of that there can be no question; and the early Romanesque cathedrals in England not only derived their inspiration from France, but were probably largely the work of Norman masons. After that comes the parting of the ways, and French and English Gothic assume their own characteristics both of plan and detail. The French cathedral plan, as already pointed out, is a finer architectural conception than the English plan with its narrow avenues. The height of the French cathedrals, and the stern grandeur of their vast masses of buttresses, produce an impression

431 King's College Chapel, Cambridge : The Fan-vaulted Roof (1446-1515)

432 West Front, Wells (13th century)

433 West Front, Peterborough (13th century ; Porch, 15th century

of greater architectural power than that of any English cathedral, but it is somewhat at the expense of repose and refinement. The increase in internal height, no doubt, is clear again in an architectural sense. Yet even in regard to interior effect the English details show a refinement which goes far to atone for the inferior scale of the buildings. It would be difficult to find anywhere in French Gothic such a consistently refined piece of architecture, taking interior and exterior together, as the choir of Lincoln, which in this respect shows, in its way, an almost Greek perfection. The Sainte Chapelle perhaps equals it in this sense. And English Gothic has the credit of having seen the way to the creation of a beautiful and consistent style before it arrived at the decorative assistance of window tracery. In this latter detail there is not much to choose between French and English work—perhaps the English has on the whole the best of it—until we come to the late period and the French Flamboyant tracery, which was an inspiration. Of the glory of the great western portals of the French cathedrals, with their deep shadow and their crowd of sculptured figures, too much cannot be said ; except for that one stroke of genius at Peterborough, all the English portals sink into insignificance beside them ; compare Figs. 424 and 426 ; the sculptured figures give the scale in both cases. In the general design of the west fronts, however, there is a greater variety and individuality in England than in France, where the west front follows in its general lines a kind of accepted scheme ; if any one doubts this, let him compare the façades of Wells and Peterborough shown in Figs 432, 433, and reflect that they were in progress at about the same time. In the matter of general exterior grouping, the French builders sacrificed this to the pardonable desire for internal height, which rendered any great central dominating feature impossible ; one can find nowhere in France so complete and balanced an exterior composition as is afforded by the three towers of Lincoln (422), the three spires of Lichfield (429), and the pyramidal composition of Salisbury with its great central spire (402). And when following closely the French type of the twin-tower façade, as they did at York (423), the English architects seem to have lost some of their inspiration. Compared with Rheims (392), this twin-tower composition is perhaps more stately, but it is certainly less poetic.

In the interior architecture French Gothic is not only loftier but more massive, more masonic in its character, than English. The French retained to a late period their vigorous and truly architectural treatment of the pier as a built column surrounded by smaller engaged shafts, and their traditional square abacus to the capital ; the pier of late English Gothic, which absorbed the attendant shafts and reduced them only to mouldings, is much weaker and less architectonic in effect. In the matter of mouldings generally, on the other hand, French Gothic is nowhere in comparison with English. There is no greater test of architectural perception than the profiling of mouldings, and in this respect the mouldings of English Gothic show a variety and refinement of contour, and a perfect suitability to the material for which they are designed, and to which French mouldings show nothing comparable ; though they fell off very much at the close of the style and became comparatively shallow and weak ; and we find in late French work

the same kind of wide shallow mouldings accompanied by great richness of decoration (425). In quitting the simplicity of the plain quadripartite vault the English builders perhaps lost something in structural expression, but they certainly added a richness of effect to the interior, and we can hardly complain of an elaboration of vaulting detail which led up to the development of the fan-vault, one of the most beautiful forms of monumental stone roofing, of which England may well be proud. In two other smaller matters of architectural expression the English showed better judgment than the French ; they defined the internal apex lines of their vaults by ridge-ribs, which the French hardly ever used, and which give a much more complete emphasis to the design of the vault ; and they placed hoodmoulds or "labels," as they are sometimes called (projecting mouldings), over their interior arches. It has been argued that the origin of the hoodmould was to throw off rain, and that therefore it is out of place in the interior ; but it has an æsthetic value also ; it takes the place of the Roman archivolt moulding, and an arch looks rather headless without it. In regard to carved ornament of a floral type, there is for the most part a finer style in French work, which even to a late period was affected by the Classic tradition of conventional foliage ; the best of the English carving, in the early period, is perhaps as good as anything in France, but there is much less of it, and long before the close of the style it had declined into a weak and ineffective naturalism. In figure-sculpture French Gothic is far superior to English ; there is sculpture at Rheims which is almost Classic in style, and superior to anything at Chartres, which has been rather over-rated ; the long lean figures flanking the porches there are rather carving than sculpture ; but the best sculpture at Chartres is very fine, and, like that at Rheims, superior to anything of the kind to be found in English Gothic. There is, indeed, the remarkable series of figures of the Resurrection on the front of Wells ; but it is very doubtful whether these nude figures, which even in their present weather-worn state show evidence of having been modelled from life, were or could have been done by any English sculptors of that date. They are more likely to have been the work of some sculptor of the early Italian school, brought over for the purpose.

So far we have been connecting the history of Gothic architecture only with French and English architecture, because that is the real and central Gothic architecture ; the Gothic of Germany, Italy, and Spain consists only of inferior variations on the central type, coloured by racial or national influences.

The Germans adopted the pointed style from France, after it had come to its full early development in that country ; consequently, the chapter of gradual development of the pointed style out of the Romanesque, which is so interesting in France and England, has no existence in Germany. Indeed, it seems a pity that Germany was ever tempted to take up with pointed Gothic, with which she had no natural sympathy, while her own round-arched Romanesque, in which some very fine buildings had been erected, might very well have been further developed into a distinct German mediæval style. As it was, her adoption of the pointed style was a plunge *in medias res*, not by any gradual development but by deliberate imitative choice. One of the earliest, perhaps

434 St Gereon, Cologne (Nave, 1200–02) (*left*)

435 Cologne Cathedral (early 14th century ; Spires later) (*left*)

436 Interior, Cologne (14th century) (*above centre*)

437 St. Stephen's, Vienna (1359–1480) (*above right*)

438 Marien-Kirche, Mulhouse

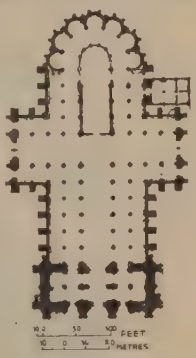
439 Interior of Church at Annaberg

440 The Spires at St. Severin, Erfu
(late 13th century) (*below left*)

441 Church at Soest (14th centur
(*below*)

the earliest, important effort in this direction is the nave of St Gereon at Cologne (434), of the early thirteenth century ; an elliptical pointed-arch nave added to a long narrow Romanesque choir. The roof is a domical ribbed vault, or rather an elliptical dome with ribs, the design of the substructure consisting of a main arcade (giving access not to an aisle but to a series of deeply recessed chapels), a triforium gallery, and two tiers of clearstory windows. The main architectural conception is a grand one, but it would probably have been a finer building if carried out in a round-arched style with a frankly domical construction ; for the ribs are a mere matter of design and have no structural value. The plan (442) is so different from anything in France, and the design of the roof, owing to the plan, so different from that of Gothic vaulting, that it will hardly bear comparison with any French church. Germany's great Gothic church, the cathedral of Cologne (435), which in scale and importance is to Gothic churches what St Peter's is to Renaissance churches, enables us to compare German with French Gothic under conditions advantageous to the former. The plan (443) is a commonplace one in comparison with such plans as Rheims and Amiens ; there is no expansion at the choir ; it is a five-aisled church of the same width throughout (except at the transept), with a semicircular east end. The interior is shown in Fig. 436. The design belongs to the latter part of the thirteenth century (a great part of the building was finished in modern times from the original drawings), and though its vast dimensions will always make it imposing, it strikingly illustrates the vices of German Gothic ; the want of repose, the tendency to exaggerate everything—exaggerated height, exaggerated multiplication of decoration, and the tendency to *tours de force* in masonry, shown in the vast open-work spires here as well as in those of Freiburg and Ulm and Strasburg. Because the tendency of Gothic is to emphasise vertical lines, in German Gothic verticality is exaggerated ; an example is seen in the long narrow windows of the church at Soest (441) ; in the case of Cologne the whole church, so to speak, runs to height, out of all proportion with its plan. The want of the sense of scale, too, is shown in such details as the enormous crocketed finials at the apex of the spires, which tend to dwarf the whole front. Strasburg, though most of it is rather earlier, belongs to the same school of architecture, and the one completed tower, later than the design of Cologne, is more refined both in general design and detail ; but it is a piece of risky masonic construction, into which hundreds of iron ties and cramps have been built to secure what would hardly have been secure as honest masonry.

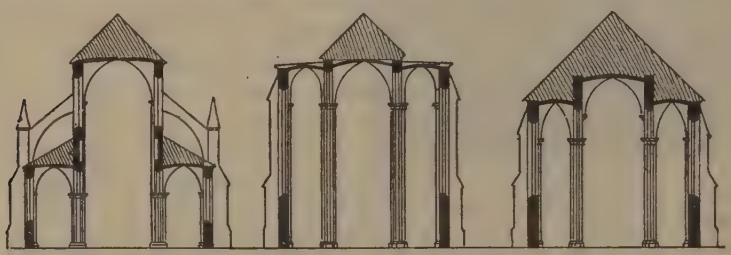
442. Plan of St Gereon.



443. Plan of Cologne.

Though in these two highly-ornamented churches the simple quadripartite vault is adopted (and Strasburg even has the heavy transverse rib of Romanesque architecture, dividing up the vault into a series of separate compartments),

in some other instances the German churches exhibit very elaborate vaulting designs, as in St Stephen's, Vienna, where the vaulting-ribs form a design more complicated than most of the late English vaulting. The façade of this church is a *mélange* of incongruous detail, but the tower and spire (437), of the same over-decorative type as those of Cologne, is a better design, and is in its way a great work. The section of St Stephen's illustrates a scheme not infrequent in German Gothic, the treatment of the whole interior as a one-story design, the main arcade rising to the springing of the vault, with the aisles the same height as the centre. Other German churches treated in the same way are those of Meissen ; Marburg ; St Sebald, Nuremberg ; Breslau ; Mulhouse, etc. Fig. 444 shows the difference between the usual section of an English cathedral and two of the types of section frequently met with in Germany. Although this disposition does not make so interesting an interior as the normal Gothic one of low side-aisles and triforium and clearstory above, nor can it be so well



Type of English Cathedral Section. Two Types of German Cathedral Section.

444.

(The shaded portions represent the space between the vault and the external timber roofing.)

lighted, it certainly does not merit the rather contemptuous terms in which Fergusson refers to it. It was an attempt at doing something original instead of merely copying the Gothic of another country, and it produces at all events a grand effect of height in the interior. In the less decorative churches of Germany the prevalent desire to exaggerate verticality in Gothic led to the fashion of immensely high and narrow windows with one long mullion down the centre and geometrical tracery in the head. St Marie at Mulhouse (438), a five-aisled church in one story, is one of the best and most favourable examples of this combination of lofty interior arcades and long narrow mullioned windows. Though there is a hard wire-drawn appearance about it (as there is about much of German Gothic), there is a simple unity of effect in the combination of the long windows, the gables breaking the line of roof above, and the well-proportioned buttresses between the windows, which produces a satisfactory whole. It is to German Gothic rather what the Sainte Chapelle is to French Gothic. One of the most favourable specimens of German Gothic is the cathedral at Erfurt (445), with its exceedingly picturesque and unusual centre tower. But in general the Germans could do little good with Gothic when reduced to plain work instead of the multifarious detail of Cologne and

Strasburg. The front of St Lawrence, Nuremberg, with its cast-iron looking towers, and the thin starved tower and spire at Breslau, are what in England we should be disposed to characterise as "carpenter's Gothic." The tendency to tricks of design appears in the fantastically shaped clearstory windows of the

445. Erfurt Cathedral: East End (Choir, 1353: Tower rebuilt, 1497).
Drawn by R. Norman Shaw, R.A.

comparatively late church of Neuss; no French or English builder would have been capable of such an escapade. In the interior of the church at Annaberg (439) we see the vault reduced to a network of twisting lines which have lost all semblance of structural origin. And in the latest period of German Gothic we meet with such monstrosities as what is called "stump tracery"—tracery bars started and then cut off short, and mouldings run through each other at

right angles by a system of interpenetration. Neither English nor French Gothic, even in their decadence, sunk to such puerilities as these.

In the brick-building districts of North Germany, in the valley of the Elbe, Gothic architecture assumes a necessarily much simpler form, the multitudinous detail of a stone church being impossible, though something like it is attempted in the curious and not very satisfactory façade of the Marien-Kirche at Brandenburg. In the partially ruined church of Chorin, or Choren, we see in the polygonal apse the long two-light windows and buttresses of Mulhouse carried out in a very solid and satisfactory manner in brickwork. But generally speaking Gothic architecture in this region is much more simple and unpretentious in form than in South Germany, and the churches in this brick style have the saving grace of showing little or nothing that is in bad taste, though their slender turrets and spires (440) are less impressive than many of the finer works of other nationalities which we have examined.

It is very different with the churches of Belgium, a country which was more within the wind of the great architectural triumphs of France. The existing churches are mostly comparatively late, but there is about them a much finer and better balanced style than we generally meet with in German Gothic. The late fourteenth-century choir of Tournai, with an east end planned on the French system, and with large five-light clearstory windows, is a fine piece of late Gothic design, though it seems a curious mingling of styles, as the lofty main arcade is stilted, and has the characteristics of late Gothic, while the tracery of the clearstory windows is purely geometrical, and in England or France would be attributed to a century earlier than its actual date. Belgian Gothic, in fact, seems to have depended not so much on any working out of its own as on imitation of French, or sometimes apparently of English work, for in the very late church of St Jacques at Liége there is window tracery which has the characteristics of English Perpendicular work, and resembles nothing in France. There is a fine breadth of design in the exterior architecture of this church, but the interior (the vault-plan of which is exceedingly elaborate) is tawdry in style, the main arcades being fringed with drop-tracery, an effect which may have been derived from Germany, where we find it, for instance, in the portal arch of St Sebald at Nuremberg, and elsewhere. St Pierre, Louvain (448), is one of the best designed exteriors, and has more of the quality of French Gothic. The late seven-aisled cathedral of Antwerp is a grand conception in plan, though the internal architecture is very decadent in style ; we see here, carried to its extreme, that suppression of the impost which has been mentioned as a characteristic of late work both in France and England, the arcades and vaulting-ribs developing straight out of the piers without the interposition of capitals. But in regard to one class of architectural feature, the tower, Belgium may make a legitimate boast. The towers of Antwerp (447) and Malines (the latter destitute of its projected spire), despite the decadent character of their detail, are grand erections with a character of their own, neither German nor French ; exhibiting the soaring character of the towers of Cologne and Vienna with a better and more masonic type of design : they are monuments that any country might be proud of. The twin western towers of St Gudule at Brussels

446 Town Hall, Brussels (15th century)

447 The Tower, Antwerp Cathedral (1518)

448 St. Pierre, Louvain (commenced 1430)

449 Palais de Justice, Rouen (completed 1499) (*below*)

450 Sta. Maria del Fiore, Florence (early 14th century: Dome 1434)

451 Milan Cathedral : West Front (1387–1418) (*above*)

452 St Anastasia, Verona (1260) (*left*)

—a kind of simplified type of the Malines tower—form also a very fine and effective group.

Belgium and Holland show also a distinct type of Gothic in their brick churches, the peculiar rather hard manner of which affords an interesting example of the effect of material on style. Had these churches, at Bruges, Utrecht, and elsewhere, been built in stone, they would have shown no differentiation in type from other structures of the same class and date; but what can be done in stone cannot be done with the same ease and freedom in brick; details and mouldings have to be simplified for execution in this less tractable material, and so a separate style of Gothic is set up, which owes its special character to the nature of the material.

In Belgium we are reminded, more than elsewhere, of the fact that the later Gothic period brings us into a time when civic and domestic architecture began to assume sufficient importance to count among the architectural monuments of a country. In the earlier portion of the Gothic period the chief erections besides the churches were castles; but however picturesque the remains of Amboise and Loches, Conway and Pembroke may appear to us now, to those who built them they were simply military engineering, and their undoubted architectural qualities spring more from the nature of honest building than from deliberate design after effect. We find occasional examples in Germany, such as the Schloss-Hof at Meissen, of a castle treated architecturally in the style of the period; and that is the general rule in mediæval architecture; buildings for secular purposes, when treated architecturally, show the same detail and mouldings as are in use in their contemporary church architecture. Thus the detail of the Town Hall of Brunswick, one of the best of the German mediæval town halls, is that which would be found in a church of the late Decorated period; the detail of the Palais de Justice at Rouen (449), the most important French secular building of the period, resembles that of a late fifteenth-century screen or jubé in a French cathedral. But few of the secular or civic buildings of the period in France or Germany are of great architectural importance. It is only in Belgium that we find civic buildings, of the mediæval period, as fine and important as the churches; and for an obvious reason. The grand town halls and cloth halls of the Belgian cities stand as the architectural illustration of the rise of commercial power; of a time when the burghers of a wealthy city could defy their hereditary and traditional over-lords, and when a great merchant and popular ruler like Jacques Van Artevelde could hold diplomatic intercourse with kings on equal terms. Such changes in the social and political scheme of life naturally find their reflection in architecture, and as the symbols of commercial and civil power there arose such noble buildings as the Cloth Hall at Ypres, with its long ranges of geometric tracery windows and its massive central tower; the Market Hall of Bruges, with its great historic belfry, celebrated by Longfellow in a charming poem; the later Tower Hall of Brussels, with its more daring but decadent tower (446), and the towerless Town Hall of Louvain, which represents almost the extreme of possible elaboration and richness of detail. These form a remarkable class of buildings, and afford a lesson at the same time on the value of breadth and simplicity in

architectural design ; for, in spite of the elaboration of ornament at Brussels and Louvain, the earlier building at Ypres (early thirteenth century) is far more dignified and impressive.

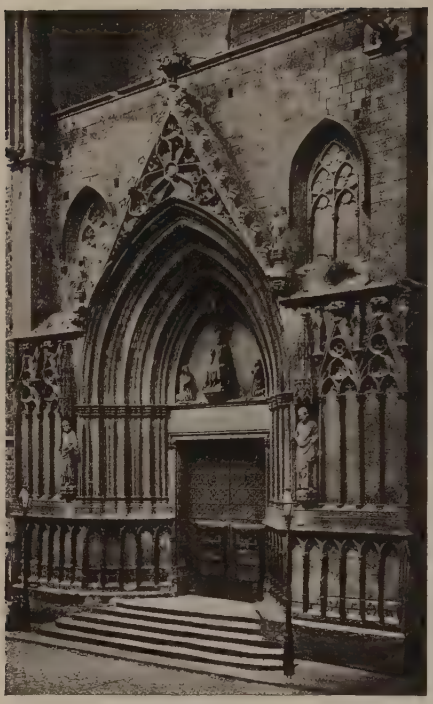
In Italy, Gothic never really became a complete and consistent style. Not only was Italian architecture at all times influenced by the Roman tradition, but the spirit of the Renaissance, which was operative in Italy nearly a century earlier than it affected the rest of Europe, cut short whatever chance of further Gothic development there might have been. Thus we see in the cathedrals of Siena and Orvieto, respectively of the middle and end of the thirteenth century, churches which employ externally the high gables and the pinnacle finials of Gothic architecture, and in which pointed and round arches are used indiscriminately, but which yet have as much Classic as Gothic feeling ; the interior of Orvieto (see page 157), with its cylindrical piers, round arches, and timber roof, having far more affinity with the Basilican than the Gothic form of church. The church of St Francis at Assisi (middle thirteenth century) is a small though fine vaulted church of more distinctly Gothic character, but depending largely for its interior effect on coloured decoration. The church of St Andrea at Vercelli (early thirteenth century), said to have been built by an English architect, has, however, much more appearance of French than English influence in its interior details ; it illustrates the tendency of the Italians to prefer flat soffits and a parti-coloured effect from the mixture of brick and marble, to the Gothic system of mouldings, and also the fact that even with quadripartite vaulting of Gothic character the Italians nearly always retained that accentuation of the transverse arch which was the legacy of the Latin and Romanesque styles. The predilection for parti-coloured walling is a characteristic feature of Italian Gothic, and in the interiors of Orvieto and Siena is carried to an extreme which is anything but pleasing in effect. St Anastasia in Verona (452) is another of the Italian type of pointed-arch churches, with an arcade of unmoulded arches with parti-coloured voussoirs, resting on cylindrical columns, the arches being tied with iron tie-roads at the springing, a constant practice in Italian Gothic, where we never meet with the balance of pressure by great buttresses which is found in French and English Gothic. In spite of the pointed arcade and quadripartite vault, nothing could be more unlike genuine Gothic than this church, and the plan is the old Latin basilica plan. In S. Martino at Lucca (fourteenth century), more Gothic in general arrangement, the pointed arch has been abandoned in the main arcade, while the small aisle windows are pointed, thus reversing the treatment found in transitional Gothic churches. A much closer approach to typical Gothic is found in some of the earlier abbey churches of Italy, such as Fossanova and S. Martino at Viterbo, of which M. Enlart has collected a number of illustrations in his interesting work on *Origines Françaises de l'Architecture Gothique en Italie*. The fact of these being Cistercian churches perhaps accounts for their conformity to a non-Italian type, as the Order would probably have its own rules for building.

The great monument of Italian Gothic, the cathedral of Florence (450), is in general effect and design even less Gothic than the churches at Vercelli and

453 The Doges Palace, Venice (late 14th century)

454 Pisani Palace, Venice (late 14th century)

455 Part of the Doges Palace, Venice (late 14th century)



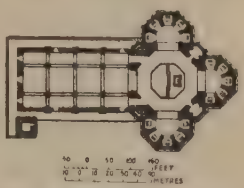
456 Detail, S. Maria del Mar, Barcelona (1328–77)

457 Interior, Burgos Cathedral (13th and 16th centuries)

458 West Front, Toledo (commenced 1418)

459 Seville Cathedral (early 15th century)

Verona. The plan, with its three great polygonal apses, is a grand one, but the interior loses its effect from the wide spacing of the arcade, so different from the long perspective of the closer Gothic arcades ; the exterior, in spite of pointed windows and a limited use of tracery, is far more Classic than Gothic in its dominant horizontal lines, and the elaborate marble *revêtement* of the exterior, whatever may be thought of the effect for its own sake, is a method of building absolutely foreign to the whole spirit of Gothic architecture. Constructional polychromy, the building and bonding together of materials of different colours, is one thing ; veneering is another thing. The campanile, a fine tower of its kind, has been misjudged and criticised as top-heavy by those who do not know, or who have forgotten, that it is incomplete, and was intended to have a spire, which would have made all the difference in its appearance. Florence, except the dome, belongs to the early fourteenth century ; the dome, which was built by Brunelleschi in the early part of the fifteenth century, might be thought almost to come into the Italian Renaissance period, but its pointed outline and the octagonal plan belong to the Gothic rather than the Renaissance type. To the late fourteenth century belongs the only great church in Italy which can be said to be really Gothic in spirit, the cathedral of Milan (451). This has been attributed to a German architect ; it is certainly different from anything else on the same scale in Italy, and it exhibits the true Gothic elements of multiplicity of parts and soaring character in its predominant vertical lines. It is no doubt very German Gothic, but the interior is a remarkable example of the sublime effect which may be produced by great height and general richness of effect, even with very bad detail. The individual or local influence, which was already beginning to come into play in Italian architecture, is curiously illustrated by the fact that at the same time as the building of Milan, only twenty miles from it, at Pavia, was being erected the Certosa church (see page 157), in a style as different as if it belonged to another world, and which (except the Renaissance façade) may be said to represent Gothic multiplicity of parts with Romanesque detail and horizontality of line.



460. Plan of Cathedral, Florence.

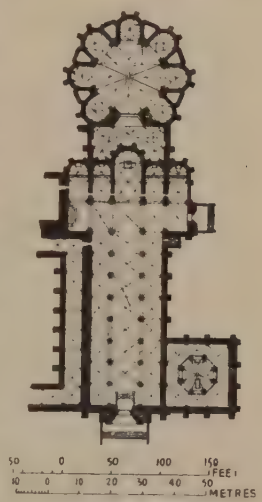
The Gothic of Venice (another instance of local influence) forms a little school of its own, coloured by the close relations of Venice with the East, whence her architecture derives an Oriental element equally impossible to define exactly or to overlook. The upper arcade of the Ducal Palace (453), with its rich tracery and straight-lined but diminishing columns, with no bases, is like nothing anywhere else in Gothic architecture ; and the fronts of the pre-Renaissance palaces on the Grand Canal (454) are equally local in style and equally touched with suggestions of the East. It is believed that the superstructure was a subsequent addition to the original composition. If this is so it was a most happy one, and far from tending to crush the light arcading, the surface decoration at once lightens the wall space and forms a foil to the delicacy of the tracery in the lower stories.

Italy contains some charming and picturesque civic buildings of the Gothic period, on a small scale, in which often, as in the churches, the elements of various styles are mixed ; as in the Palazzo Communale at Piacenza, with its pointed arcade below and round-arched openings in the upper story, with a pointed-arch corbelling under the arcade ; the whole Gothic in spirit, but, like many other Italian buildings of the period, impossible to classify as to style. It is in this sense rather typical of the Gothic period in Italy ; a period of mixed and uncertain aims in architecture.

Of the countries which followed the lead of France in Gothic architecture, Spain undoubtedly stands above either Germany or Italy. The idea of Spanish Gothic is popularly connected more with Burgos Cathedral than with any other building, the complicated picturesqueness of its late west front having been photographed and sketched over and over again, till people get the idea that Spanish Gothic is a picturesque but over-florid edition of the style. They might just as well judge of French Gothic from the west front of Troyes. The doorway from S. Maria del Mar, Barcelona, for instance (456), with its surrounding detail, is quite sober Gothic work, which might almost pass for English. The fact is that the interior of Burgos resembles, in the architectural style of the piers and vaulting, the best style of French thirteenth-century Gothic ; as Street observed, there is little in the architecture to suggest that you are not in France. In the view of the interior given here (457) it is the distant portion with the quadripartite vault to which this remark would refer, not the foreground, which is sixteenth-century work in a very mixed and corrupt style. Tarragona has the solid architectural quality of a French Transitional church, with shafts with square caps and the main arches with hardly any mouldings ; and, curiously enough, in the octagonal lantern over the crossing (a frequent feature in Spanish Gothic) are groups of " lancet," windows exactly like Early English work. The immense five-aisled cathedral of Toledo represents in its original interior architecture the best type of French thirteenth-century Gothic, with the significant exception of the little Moorish touch in the triforium of the choir, which has cinquefoiled arches of horseshoe shape. Such slight traces of Moorish influence are to be found from time to time even in thirteenth-century Spanish work ; in the fourteenth and fifteenth centuries they become more frequent and obvious ; and it is no doubt the tradition of Moorish richness of detail which led to the taste for a profusion of decorative detail in late Spanish Gothic, which is so insistent in the later portions of Burgos Cathedral.

The plan of Toledo is essentially French, and somewhat like that of Bourges on a larger scale. The west front (458) shows a cavernous portal of quite French type, though a good deal of the surrounding detail is rather incongruous ; the small arcaded loggias at each side, in the upper part, are a Renaissance addition. The tendency to a great proportion of width to length in the Spanish church plans has already been referred to ; some of them are absolutely square, though the fact is of course masked, internally by the division into aisles. An unfortunate peculiarity of the typical Spanish cathedral plan is the interpolation of a lofty choir enclosure into the middle of what should be

the nave ; some of these choir screens, of late date, are magnificent work in themselves, but the effect is to oppose an obstacle to the architectural vista in the very centre of the church. At Barcelona and in the north-east of Spain there is a prevalence of a special type of plan with internal buttresses (forming chapels) and wide vaulting ; in Barcelona Cathedral this form of plan is carried out with three aisles and a transept ; in two churches at Barcelona, St Maria del Mar and St Maria del Pi, it is carried out without transepts, each church being a parallelogram with an apsidal termination and no external break whatever, and in St Maria del Pi with no aisles, an interior vaulted in one span. At Gerona, in the same neighbourhood, is a much larger church of similar plan, where the apse and one bay westward of it having been vaulted on the three-aisle plan, the rest of the church has been vaulted in one span of 78 feet (a very bold undertaking), leaving the three-aisle vault to be seen at the end in section, as it were. This class of plan may be traced to the influence of such churches as those at Albi and Toulouse in France, not far from the Pyrenean border. Seville Cathedral, possessing the largest area on plan of any mediæval cathedral, exhibits the peculiarity of having a mosque plan—a wide area covered with piers at nearly equal distances, having been built on the site of a Moorish mosque cleared away to make room for it.



461. Plan of Church at Batalha.

Of the late Gothic of Spain, the west front of Burgos, already referred to, with its twin spires of open-work, looks like a design by a German architect, influenced by the taste for richness of decoration which the Moors had left behind them in Spain. The still more ornate centre tower over the crossing (370) is as late as the middle of the sixteenth century (for Gothic lingered later in Spain than elsewhere), perhaps nearly a century later than that of St Ouen, with which it may be compared, but to which it is very inferior. But as the Spanish architects did not aim at carrying their vaults as high as the French, they were able with safety to adopt lantern erections over the crossing, which are among the most pleasing external features of their churches ; the late example at Valencia is a beautiful piece of work, though destitute of some kind of finish which it was intended to have. Salamanca and Segovia are the two latest Gothic cathedrals of Spain ; the latter affords an example of the manner in which the Spanish, whose vaults in the early period were so solid and plain in their structure, at the close of the style rushed into the extreme of complication in the design of their vaults ; the majority of the ribs being, of course, merely decorative.

The most remarkable Gothic monument remaining in Portugal is the church of the monastery at Batalha, of late fourteenth-century foundation, with a great octagonal tomb chapel at the east end, some twenty years later

than the church, and apparently never roofed in (see plan, 461); this, though separated internally from the church, forms, externally, one architectural group with it (369). The church is said to have been built by an English architect, and to have some English characteristics in the detail, though as a whole it is a very unusual building, resembling nothing else in Gothic architecture. The plan, apart from the octagonal chapel, is much more like that of a Romanesque than a Gothic church. At Alcobaça, not far from Batalha, is a large Cistercian church in the severe style of the twelfth and early thirteenth centuries, remarkable both for its comparatively pure style and for the fact that it shows the German type of section, before alluded to, of three aisles of equal height.

In considering Gothic architecture as illustrated mainly in the great churches of the Middle Ages, which are by far the most important of its monuments, it must not be forgotten that in many cases these churches were not isolated buildings, but were the dominating erection of a group of conventual buildings, mostly ranged about a square cloistered court which abutted on (generally) the south side of the nave of the church (see the plan of Salisbury, page 205). Allusion has already been made to the beauty of some of the English "chapter-houses," which formed an important feature in the group of buildings. In most cases the remainder of the convent buildings are either ruined or converted and built up with modern buildings; but a large proportion of the cloister arcades have been preserved—many in England and in Spain, and some in France, Germany, and Italy. These cloister arcades are among the most beautiful things that mediæval architecture has produced.

In comparing Gothic with Greek architecture one most important distinction has to be borne in mind, which is at the root of a great deal of the æsthetic meaning of these two greatest styles of architecture, viz., their radically different assumption in regard to the element of *scale* in architecture. In Greek architecture the scale has no reference to anything but the relative proportions of the building itself. A large Doric temple is just the same in its proportions as a small Doric temple; the latter is a reduced reproduction of the former, except that some of the corrections for optical distortion would be omitted, as of less consequence with smaller dimensions. In a Gothic building the standard of scale is the human figure. A great portal arch might be erected to give dignity to the entrance, but the actual doorway is kept to the reasonable dimensions referable to the stature of man. Consequently, a large Gothic building is not like a small one magnified; its greater scale is expressed by repetition and multiplicity of parts, not by their mere enlargement. Which of the two is the grander theory of architectural scale may be a matter for dispute. Of their important and radical difference, as influencing architectural style and expression, there can be no question.

Of all the architectural styles of history, Gothic was the most vivacious and changeful, because it was ever seeking after improvement. The very intensity of its vitality shortened its history. While Egyptian architecture went on for century after century undisturbed in its conservative repose, Gothic architecture, continually on the strain for improvement, arrived in the sixteenth

century at the point when it seemed that nothing further could be done. What might have happened to it if left undisturbed at this point one can only conjecture. But a change had come over the spirit of the dream. The Renaissance movement had arisen, and henceforth architecture was to be no more the history of national styles, but of the aspirations of individual artists ; was to be a matter of intellectual choice rather than of automatic evolution.

462. Coutances Cathedral from the South-East (early 13th century).

A.D.	EVENTS IN GENERAL HISTORY.	ITALY AND SICILY.	FRANCE AND BELGIUM.
1100			
		La Martorana, Palermo.	Vézelay Abbey.
		Leaning Towers, Bologna.	Laon Cathedral. Pontigny Abbey founded.
	Henry I of England.	Cathedral, Ferrara.	
			Cluny Abbey completed.
	Frederick Barbarossa : diet of Roncaglia.		St Vincent, Senlis. St Denis, Paris.
			Notre Dame, Paris, commenced.
	Becket murdered in Canterbury Cathedral.	Baptistery, Pisa, commenced.	Sens Cathedral completed. Le Mans Cathe-
	Richard Cœur de Lion.	Cathedral, Monreale.	[dral.
	[extended.	Leaning Tower, Pisa, com-	
	Innocent III : Temporal Power of Pope	Cathedral, Palermo. [menced.	
1200			Chartres commenced.
		S. Maria, Toscanella.	Choir, Rouen. Troyes commenced.
	Magna Charta signed.	Broletto, Como.	West Front, Notre Dame (to base of towers),
			Bourges Cathedral commenced. [Coutances.
	Henry III, England.	Church at Chiaravalle.	Towers of Notre Dame completed. [pleted.
			Rheims Cathedral. Chartres Cathedral com-
		Church at Assisi.	Amiens Cathedral. Ste. Chapelle, Paris.
	Rudolph of Hapsburg, Emperor of Ger-	Siena Cathedral.	
	Normans expelled from Sicily. [many.	S. Anastasia, Verona.	Cloth Hall, Ypres, completed.
		Florence Cathedral com-	
		Orvieto Cathedral. [menced.	[menced.
	First English Parliament summoned.	Communal Palace, Pistoia.	Choir, Notre Dame. Belfry, Bruges, com-
1300			
	Battle of Bannockburn.	Prato Cathedral.	
	Battles of Creçy and Poitiers.	Florence Cathedral : nave.	Bourges completed. Cloth Hall, Ghent.
	The Jacquerie riots in France.	[menced.	Beauvais : Choir Vault rebuilt.
	" Black death " Plague in Europe.	Ducal Palace, Venice, com-	Choir, Tournai. Papal Palace, Avignon.
	Du Guesclin : English reverses in	San Martino, Lucca.	
	[France.		
	Henry IV of England.	Ducal Palace, Venice.	
		Milan Cathedral. [Bologna.	
		Certosa, Pavia. San Petronio,	
1400			
	Battle of Agincourt : Henry V.	Pazzi Chapel, Florence.	
	Jeanne Darc : loss of English influence in	Dome, Florence Cathedral.	St Pierre, Louvain.
	[France.	Pitti Palace.	
	Wars of the Roses commence.		
	Ferdinand and Isabella of Spain.	Renaissance Façade, the	Town Hall, Louvain. Town Hall, Brussels.
	Battle of Bosworth Field. Henry VII,	[Certosa.	
	[England.	Vandramini Palace, Venice.	
	Conquest of Granada : expulsion of Moors	Cancelleria, Rome.	
	[from Spain.	S. Trinità de Monte, Rome.	Palais de Justice, Rouen. Château, Blois.
1500			
	Sicily united to Spain. Julius II, Pope.	St Peter's commenced.	North Spire, Chartres. West Front, Troyes.
			West Front, St Ouen. S.W. Tower, Rouen.
	Francis I, France. Henry VIII, England.	S. Zaccaria, Venice.	Church of Brou-en-Bresse. Tower, Antwerp.
	Luther : Diet of Worms. Charles V,	Farnese Palace.	Château of Chambord. Fontainebleau.
	[Emperor.		St Eustache, Paris.
	Catherine de Medici. Queen Elizabeth.	St Peter's Dome.	Town Hall, Antwerp (Classic).
	Spanish Armada.		Transepts, Beauvais. Palace at Sens.
	Henri IV, France.	Borghese Palace.	First portion of Louvre.
1600			
	Cardinal Richelieu. Thirty Years' War.		

ARCHITECTURAL MONUMENTS.

England.	Germany.	Spain and Portugal.
St Albans, Nave, Gloucester. Choir, Norwich. Nave, Durham, in progress. Norman Nave, Westminster Nave, Rochester. Peterborough commenced. Nave, Norwich.		
West Front, Lincoln, completed.	Church at Gelnhausen ?	Old Cathedral, Salamanca. S. Isidoro, Leon, completed. Santiago Cathedral. Tarragona Cathedral in progress.
Barfreston Church ? Nave, Ely. Choir, Canterbury. Galilee Chapel, Durham.	Choir, Bonn. St Martin, Cologne.	
West Front, Ely. St Hugh's Choir, Lincoln.		
West Front, St Albans. West Front, Peterborough. West Front, Wells. Henry III Lady Chapel, Westminster. Salisbury. Gloucester Nave vaulted. Glasgow Cathedral commenced. Choir and transepts, Westminster, completed, and eastern part of nave rebuilt. Angel Choir, West Front, Lichfield. [Lincoln.	Nave, St Gereon, Cologne. Limburg-on-the-Lahn. St Sebald, Nuremberg.	Church at Alcobaça. Temple Church, Segovia. Toledo Cathedral commenced. Burgos Cathedral. Cordova Mosque converted to a [Church.
	Church, Altenberg, commenced. Choir, Xanten. St Elizabeth, Marburg. Nave, Bonn. St Lawrence, Nuremburg, com- St Severin, Erfurt. [menced. Strasburg Cathedral.	Barcelona Cathedral commenced.
Spire, Salisbury. Chapter House, Southwell. Centre Tower, Lincoln. Exeter Cathedral in progress. Nave and West Central Lantern, Ely. [Front, York.	Marien-Kirche, Mulhouse ? Cologne Cathedral. Church at Soest. Freiburg Spire.	S. Maria, Barcelona. Court of Lions, Alhambra.
West part of Westminster Nave commenced. [Wykeham. Norman Nave of Winchester transformed by	Choir, Erfurt. Choir, Aix. St Stephen, Vienna, commenced. Ulm Cathedral founded.	Batalha.
Nave, Canterbury. Cloisters, Gloucester.	Church at Annaberg. West Front, Ratisbon.	Seville Cathedral. Lantern, Valencia Cathedral. West Front, Toledo. Nave, Gerona.
West Front, Exeter.	Choir, Salzburg.	Burgos : west front in progress.
Central Tower, Canterbury, completed. St George's Chapel, Windsor.	St Stephen, Vienna, completed. Tower, Erfurt Cathedral.	Church at Belem.
Henry VII Chapel, Westminster. King's [College Chapel, Cambridge.		Leaning Tower, Zaragoza. Casa Pilatos, Seville. New Cathedral, Salamanca. Cloisters, Santiago. Segovia Cathedral in progress. Town Hall, Seville. Burgos : crossing and lantern. Casa de la Infanta, Zaragoza.
Hampton Court (Wolsey).	Heidelberg (first Renaissance). Portico, Rathaus, Cologne (Classic).	
Longleat.		
	Heidelberg (later Renaissance). Jesuit Church, Cologne (late Gothic).	

CHAPTER VII

THE RENAISSANCE

Although, as has been said, the Gothic style in France and England, and in the latter country more especially, came to an end through having exhausted its resources in the constant effort after improvement, and the temple of architecture in those countries was swept and garnished for the entry of the new spirit of Renaissance architecture, this exhaustion of Gothic architecture on the scenes of its greatest achievement was not the cause of the new movement, but merely left the ground free for its acceptance in Northern Europe. Italy was the cradle of Renaissance architecture ; Italy, which had never taken kindly to Gothic or truly assimilated its spirit or carried it to any perfect achievement ; and the great change in architecture, originated on her soil, was not due to the following out of any problem of construction, but to a movement which at first might have seemed to be quite outside of and unconnected with architecture. This was the revived interest in classical literature, Latin literature more especially, and by consequence a revived interest in the remains of the architecture of the Roman period, which abounded in Italy, and more especially in Rome itself ; remains which through centuries of semi-barbarism and conflict had been allowed silently to moulder into decay, amid generations to whom they were objects of indifference or at best of bewilderment ; at worst, useful quarries of hewn stone. But now that classical literature had been unearthed, and Virgil and Ovid, Cicero and Livy, were names to conjure with, the architecture of the age which produced this literature became also an object of interest, and a standard for imitation or emulation. Be it observed that it was from the remains of Roman architecture alone that the inspiration came ; there is no indication that the great Italian architects of the Renaissance had any knowledge of the far superior columnar architecture of the Greeks. Little was probably yet known of Greek language and literature ; no one had "settled ὅτι's business" or unravelled "the doctrine of the enclitic δε" ; and an exploration to Greece in search of possible architectural monuments would have involved the considerable chance of either being knocked on the head on land or captured by Turkish pirates at sea.

Architecture thus, for the first time in her great history, took to looking not forward but backward, to the precedents of what was considered to be, and was in some senses, a greater age ; and, except for the brief glories of Indo-Saracenic architecture, the art has henceforward been governed more or less by precedent and example ; the attitude, once taken up by what was at that time the most cultured society in the world, has been maintained ever since. An equally important and far-reaching distinction is that architectural design now became, not an automatic evolution of style influenced by construction and material, but a conscious artistic effort, the outcome not of habit but of

463 Château of Chambord (1519–47)

464 Château of Chenonceaux (1515–56)

465 Syon House, Middlesex (1762)
Robert Adam, architect

466 Powis Castle, Wales (*c.* 1620)

choice and culture ; the expression not of national but of individual taste and style. National character still retained a certain influence, inasmuch as the Renaissance architecture of France differs in some respects from that of Italy, and German Renaissance from both. And the influence of individualism was not entirely a new thing ; there were Greek and Roman architects who had their special fame ; and Haiga Sophia at Constantinople, and the west front of Peterborough, were certainly inspirations of individual genius. But from the Renaissance onwards every important building is the work of an individual architect ; is connected with his name and is quoted as an example of his particular merits or demerits. It needs but little thought to understand how inevitable was this more specialised individual control over an architecture of ideals uncovered through the researches of men of learning. Building that was part of the life of the people and identified therewith gave place to a new system dependent upon the taste and study of a comparatively few outstanding men, and though these men were merely an integral part of an age finding a fuller life in the light of past great civilisations, it took time before the new system became once more definitely associated with the life of the people.

Many have been the individuals and many the schools of thought under which the right and wrong of Classic or Gothic have been passionately preached. Truly there is no question of right or wrong in such controversy. The Gothic builder sought his worlds to conquer, and when they were once in thorough subjection, the style naturally declined. Had the architecture of the Renaissance period failed to express the knowledge of ancient Rome, newly discovered to the isolation of the Middle Ages, it would have been a lie to posterity.

One finds oneself in hopeless confusion if an attempt is made to weigh the one style against the other in merit or demerit. So much valuable energy in the past has been squandered upon this profitless subject, that it is with some relief that one feels that the battle of the styles is at last dead and buried. There is but one style for any age, and it is its own. What we have to recognise is that architecture is *different* from what it was before the Renaissance, and must inevitably remain so ; it has eaten of the fruit of the Tree of Knowledge, and can never regain its pristine innocence. It is useless to grumble at what we cannot alter, and foolish to pretend that there is no longer any interest in the art. Mere copyism, like that of most (not all) of the English churches of the Gothic revival, is no doubt totally uninteresting and foredoomed to failure ; but we are not necessarily reduced to that. The great architects of the Italian Renaissance were no mere copyists ; not only did they show a great deal of variety and originality in the combination of materials drawn from classic sources, but it may be said that their best buildings are superior in beauty and refinement to anything that has been left to us of the Roman architecture from which they professed to draw their inspiration.

The essential points in Italian Renaissance architecture were the emphasising of the horizontal line, especially by the adoption of the Classical cornice, or a variation of it, as the crowning feature, and the employment of the columnar order as an element of decoration and expression in the design ; and the merits or demerits of many of the Renaissance buildings turn very largely on the

manner in which the columnar order is used. But it was not at once that the column or pilaster assumed this importance in Renaissance architecture. Nor, in spite of the fact that the remains of Roman architecture were the foundation of the Renaissance, was Rome its real birthplace. The Renaissance at its outset emanated from Florence. Brunelleschi (1377–1446), the earliest born of the great Renaissance architects, in the earlier part of his career signalised himself by carrying out the dome of the cathedral of S. Maria del Fiore, a task which no other architect of the day had been able to face ; and that dome, octagonal on plan and pointed in section (see page 223), was, except for some minor details, a Gothic erection (as Gothic was understood in Italy). The new movement was not fully started till, somewhere between 1440 and 1450, Brunelleschi commenced the Pitti palace (469), And Michelozzi (1396–1472) the palace in Via Larga (the Via Cavour of modern Florence) for the then all-powerful Medici, subsequently known as the Riccardi palace (471), from the name of the family it was sold to. The latter is the more characteristic building of the two ; it retains a certain amount of mediæval feeling in the arching of the windows, their centre shafts and the geometrical tracery in the head, and in the defiant manner in which the few great arches in the ground story are spaced, regardless of any centre line with the windows above. But two-thirds of the wall are worked in rusticated masonry, a source of effect entirely un-Gothic, and the whole is crowned by a mighty cornice on Classic lines, projecting 8 or 9 feet from the wall ; the cornice is proportioned to the whole height of the wall, which takes the place of the columnar order. The Strozzi palace, built by Cronaca (1457–1508) some thirty or forty years later, is architecturally nearly a repetition of the Riccardi, cornice and all. It must be admitted that these great cornices are rather a piece of architectural braggadocio, since their projection is, of course, far greater than the thickness of the wall, and they can only have been made safe by cramping down in the rear ; but of their grand effect there can be no doubt, and it is rather amusing to contrast the Florentine idea of a cornice with that of the framers of the London Building Act, where the projection of a cornice is limited to 2 feet 6 inches. The vast mass of the Pitti palace is a remarkable example of the effect which may be produced, with a very simple design, by mere scale and breadth of treatment, the whole masonry being treated as rusticated. It is curious that with all this mass of forcibly treated wall-surface, the architect does not seem to have realised the importance of a dominating cornice proportional to the building ; the cornice is paltry in character and proportions, and is the one weak point of the Pitti. This, however, may not have been the fault of Brunelleschi, who did not complete the building. The Gondi palace at Florence, built about 1490 from the design of Giuliano Sangallo (470), was evidently an imitation in general design of the Riccardi, but differs in some significant points : there are no colonnettes or tracery in the windows ; the rustication, confined to the ground story, is of a smoother and neater character ; and the voussoirs of the window-arches, instead of forming simple round arches as at the Pitti and the Riccardi, are stepped on the outer edge, in the manner which has become a commonplace since, to work into the horizontal courses of the masonry. Thus

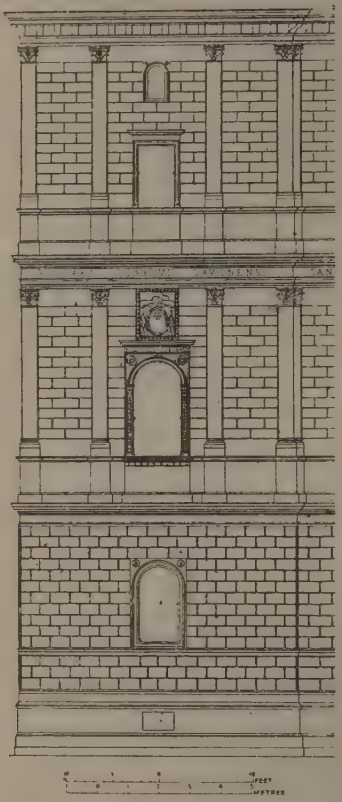
was initiated that treatment of the jointing of the masonry as an element in the design on which Ruskin poured such contempt, but which is not out of place in Renaissance design ; it emphasises the fact that this is an architecture of large stones, as Gothic was an architecture of small ones.

The prominent position occupied by the Pitti and Riccardi palaces at the commencement of the Renaissance is significant of a period when architecture was no longer to be represented almost exclusively by churches ; both art and life had become, as it were, secularised ; and except for such great monuments as St Peter's and St Paul's, and some notable churches of more ordinary dimensions, architecture during the Classical Renaissance in Italy and France (and in a less important manner in England) is represented mainly by palaces and mansions. Du Cerceau's work (1576–79) illustrative of " Les plus excellents Bastiments de France " does not contain a single church, an omission significant enough when taken in connection with its title ; and the proportion is very small in Campbell's *Vitruvius Britannicus* some hundred and fifty years later (1717–25). Among the churches of the early Renaissance period that of S. Andrea at Mantua, designed by Alberti (1404–72), is noticeable as representing a type of plan and architectural treatment afterwards very generally adopted in Italian churches ; it is the Basilica plan with a transept added, and a dome over the intersection of the transept. After the Renaissance, the dome became in Italy the favourite form for the principal feature of a church ; it was to the Italian Renaissance church what the central tower was to the English mediæval cathedral, and, for dignity of architectural effect, is undoubtedly superior to the latter. A later church at Lodi, designed by Bramante (1444–1514), shows an almost Byzantine type of plan—a square central space with a lofty dome, with a large apse opening out of each side, each roofed with a semi-dome ; the plan thus forming a Greek cross with the four arms rounded off. It has the making of a very fine building, spoiled by the mechanical treatment of the walls with tiers of pilasters one over the other ; but the general composition is of interest because it somewhat foreshadows that afterwards adopted by Michelangelo for St Peter's.

Brunelleschi, however, twenty years before he built the Pitti palace, had shown his ability in two churches at Florence (besides carrying out the dome of the cathedral), the beautiful Pazzi chapel and the church of Santo Spirito, both worth mention for special reasons. The former (473) is a piece of really original architecture in a new manner ; the graceful portico with its rather slender columns, and the general composition, resemble nothing either Roman or Gothic. The Santo Spirito church is a fair specimen of a Classic arcaded interior, and it is of interest to note that after a long period of suppression, the entablature once more appears interposed between the arches and the supporting columns. Such signs are strong evidence of the increasing hold of Roman principles as against the stubborn relics of the Gothic. He had, however, as we have seen, kept his great palace clear of all adventitious Classical features. But now the passion for antique forms was to invade palace design ; and Alberti, the next chronologically of the great Renaissance architects—a man of universal culture and great character, and who wrote the grandest handwriting ever seen

—showed the way in his Rucellai palace at Florence (467), where three nearly equal stories are surface-decorated with pilasters with carved capitals, widely spaced and with windows between them very similar to the Riccardi windows ; it is the Riccardi palace architecture, in fact, with a facing of pilasters added to the wall ; but instead of the great cornice of the Riccardi, proportioned to the whole height, there is a cornice approximately proportioned to the order of the

467. Rucellai Palace, Florence (1460).



468. Palace of the Cancelleria, Rome (*c.* 1490).

upper story, while the string-courses dividing the other stories are magnified into cornices proportionate to the pilasters. For thus far the architects who introduced the order at all were slaves to it ; it must have its orthodox entablature, even if only for show ; they had not learned to adapt it. The Rucellai palace is a beginning, but it illustrates what may be called the second phase in Renaissance architecture, the employment of the order on a small scale on different stories of a design. The Cancelleria at Rome (468), by Bramante, is a design of the same school ; but Bramante managed to avoid the monotonous effect of the Rucellai palace by grouping his pilasters in pairs, putting the

469 Pitti Palace (1458–1570)

Brunelleschi and Ammanati, architects

470 Gondi Palace (1490)

Sangallo, architect

471 Riccardi Palace (1430)

Michelozzi, architect

472 Loggia of Courtyard, Borghese Palace, Rome (1590)

473 Pazzi Chapel, Florence (*c.* 1415)

474 Palazzo Communale, Vicenza

475 Part of Library, Venice (*c.* 1540)

windows between each pair, and omitting the pilasters altogether on the ground story, where there are simple round-arched windows inserted in a plain mass of wall which forms a base to the more decorative design of the upper portion.

It was possible, however, to produce much more picturesque and effective contrasts than this, by the use of the order in one story only, on a ground story of a different character ; as is shown in the effective façade of the Pompeii palace at Verona (483), by Sanmicheli (1487–1559), with its massive rusticated walling and arched openings below, contrasting with the graceful columnar order in the upper story ; and in the same architect's Bevilacqua palace at Verona, where the ground story has an order of strongly rusticated engaged columns, part of a mass of rusticated walling, contrasting with the more delicate treatment of the upper story. One merit of this manner of designing is that it preserves the character of a thing *built*, instead of looking like an architectural model ; a point which may be appreciated by comparing the Pompeii palace with the much admired Library at Venice by Sansovino (475), an architect exactly contemporary with Sanmicheli ; here, in the almost identical and highly conventional treatment of both stories, we seem to lose the idea of building altogether ; it gives the impression of an immensely magnified piece of furniture design, a kind of architectural cabinet. A rather similar piece of architectural cabinet-work is the more elegant and graceful Scuola de San Rocco at Venice, with its Corinthian columns in two stories standing free from the wall. Among examples of the great variety of invention which can be found among buildings of the Italian Renaissance of much the same period we may instance the Guadagni palace at Florence (a little earlier than those just mentioned), attributed to Cronaca with the columnar order used only for an open loggia at the top, above a flat wall decorated with *sgraffito* between the windows ; the playful treatment of the Palazzo del Consiglio at Verona (also early in the style), with its graceful open arcade below and the decorative treatment of the upper story—a building which, like Brunelleschi's Pazzi chapel, is in a new style, neither Roman nor Romanesque nor Gothic ; Mazzoni's Spada palace at Rome, with its lofty rusticated basement and the range of alternate windows and statues above (the decorative relief ornament above this, which is only plaster, was probably a later addition) ; and the little known Tarugi palace at Montepulciano (482), by Antonio Sangallo (1485–1546 : nephew of Giuliano), one of the most pleasing and well-proportioned of the buildings in which the applied columnar order was a principal feature ; in this case the order is used on two different scales, for the upper story is too high in proportion to the other to be called an attic. Designs such as the façade of the Certosa at Pavia (481), and that of St Maria dei Miracoli at Brescia, with their multitudinous decorative detail, are exceptional and due to special influences—they do not represent the spirit of Renaissance architecture ; indeed, the Certosa façade, in spite of its date, and its details is more Gothic than Classic in spirit. And then, strangely enough, after all the use of columns that we have seen, in the Farnese palace (another of Antonio Sangallo's works, though he did not complete it) we come, just a century later, on a return to the same dependence on simple wall and window treatment as in the Pitti palace, only in a different spirit, and with a

an architect of genius, and perhaps the real reason why his name has been thought synonymous with dullness and conventionality in architecture is that many have adopted his rules without possessing his genius.

It was Michelangelo who was the real and uncompromising prophet of the colossal order ; and this prepossession of his, for good or ill, set its stamp on the greatest and most remarkable building of the Renaissance—in some respects one of the most remarkable buildings ever erected—the great church of St Peter at Rome. Into the extraordinary history of the building we cannot go here in detail. From the first it was planned to be on an immense scale, and was actually started in the middle of the fifteenth century, from the designs of Rossellino (1409–1463), who only commenced the western apse (subsequently removed to make way for Bramante's work), the project being postponed by the death of the then pope. In 1506 Bramante was commissioned to resume operations on his own plan, which was to be a great triapsal church with a comparatively long nave (the width was so great that it could not be called long in proportion), and a vast dome at the crossing. But after the main mass of the four great piers had been erected, there arose a timidity as to the task of bridging over the great space between them, and for many years these huge piers stood, as shown in an old engraving, amid waste ground and small houses, waiting for the next step to be taken. In 1514 Bramante died, and Raphael, of all men to deal with a great constructional problem, was appointed to succeed him, with evidently no liking for his task and no idea what to do with it. On his death Peruzzi was appointed, who reduced the intended plan to a Greek cross, retaining the idea of the three great apses. Still the dome was not attempted, and Antonio Sangallo succeeded to him, retaining apparently his plan, but adding a vast narthex to it, and making a model of his intended design, with a central dome and a tower at each angle, and treated in three stories, each with its own order ; the whole showing a multiplicity of parts rather Gothic than Classic in spirit, in spite of the detail. But all he actually carried out was the strengthening of the piers for the dome. In 1546 he also was gathered to his fathers, and the work fell to the hand of Michelangelo, to whom, of course, Sangallo's multiplicity of comparatively small detail was anathema. He retained the Greek cross plan, though not giving nearly so much prominence externally to the sweep of the three apses, and carried out the building on his own scheme of a colossal order 100 feet high, with the conventional attic above it (489). The dome was at last carried out, in his lifetime, and the lantern afterwards, from the design which he had left. The entrance façade was unfinished ; he had intended to have a portico of free columns in front of it—columns 100 feet high and wide in proportion, like so many circular towers of masonry. They would have had a sublime effect, but would have been difficult to build, besides requiring such immense blocks for the entablature ; and the architect (Maderno : 1556–1629) who subsequently added the nave shirked the task, and was content with piers with pilasters on them. The addition of the nave no doubt adds to the internal effect, but externally it has had the unhappy result of destroying Michelangelo's pyramidal composition, and throwing the dome too far back from

478 The Capitoline Museum, Rome (1542)
Michelangelo, architect

479 Farnese Palace, Rome (1530)
Sangallo, architect

480 Chiericate Palace, Vicenza (*c.* 1560 ?)
Palladio, architect

481 Renaissance Façade of the Certosa, Pavia (1473) (*above*)

482 Tarugi Palace, Montepulciano (early 16th century) (*top right*)

483 Pompeii Palace, Verona (*c.* 1540)

the façade (488), so that it is lost to the spectator as soon as he draws near the front.

There is no doubt that a great deal of the detail of St Peter's is very bad; the attic especially is clumsy and uninteresting in design, and the immense proportions of the order, until one actually finds out its size, tend to give a false impression as to the actual scale of the building. Perhaps this would not be so much the case, however, were not the eye further cheated by the Brobdingnagian dimensions of much of the sculpture. And when we compare the present building with Sangallo's design, we may perhaps almost question whether, in spite of bad details, Michelangelo's idea as to the grandeur of the colossal order was not possibly right after all. At any rate, the present cathedral is more impressive than Sangallo's would have been. And for the dome and lantern, the latter so admirably suited in proportion and outline to its position, there can be nothing but praise. Together they form one of the finest things ever erected by the hand of man, striking the eye with their sublimity from every point of view, near or distant.

The Renaissance palaces of Genoa form a group of some importance, mostly the work of one architect, Alessi (1500–72), who might be called the Palladio of Genoa, but with a difference. For one thing, he could occasionally be satisfied with a façade without an applied order, as in the Durazzo palace, a block with a raised centre with a strong cornice, and wings with an arcaded loggia in the upper story; but otherwise the architectural design resides simply in the arrangement of the symmetrically spaced windows. In other façades, as in the Tursi Doria palace, he employed pilasters as a decorative element, in what had come to be considered the orthodox manner; in this case rusticated pilasters in the lower story and fluted ones above; the style of the whole is powerful, but the want of refinement in the details, in comparison with what we find in the Renaissance palaces of Florence and Rome, shows that the architectural culture of those centres of the new art had not spread to the northern seaport. Some of the Genoese palaces have, however, very stately staircases, of which that in the Durazzo palace (486) is a good example. Genoa boasts also a domed church by Alessi, the church of the Carignano, the general composition of which, with the central dome and four angle towers, has the making of a fine building, spoiled by the commonplace character of the detail.

As in the mediæval period, so in the Renaissance period, Venice, with her exceptional position and her Oriental association, made to some extent an architecture of her own, different from that of other Italian cities. Palladio and Sansovino, it is true, took with them to Venice their Tuscan taste and training, and their buildings erected there are such as might be found in any other city of Renaissance Italy. But there is a type of Venetian Renaissance which belongs to Venice alone. Among her earlier buildings of the period the façade of the church of San Zaccaria (487), built early in the sixteenth century, is essentially a Gothic façade with Renaissance details; there is nothing in it of the severely Academical character of the monuments at Rome, Florence, and other cities of western Italy. In the courtyard of the Doge's

palace, somewhat later, Classic details are employed with a remarkable freedom from rule or precedent, the arcade of the main story even showing pointed arches, which are rather out of keeping with the general design. But the special note of Venetian Renaissance is to be found in some of the palaces of the early sixteenth century. In the Vendramini palace (484) a small columnar order is employed in the two upper stories, but the effect of the front, with the large circular-headed windows with a geometrical tracery in them, between the columns, is something perfectly different from the general type of Italian Renaissance architecture ; something more picturesque and more free in character. The Grimani palace, by Sanmicheli, somewhat later, has more of the Classic style in its details, but still with a broad freedom in the treatment of the large circular-headed windows. The Cornaro palace, by Sansovino, commenced towards the middle of the century, and the seventeenth-century Pesaro palace (485), by Longhena (1604–82), have a more restrained Classic style ; both show the treatment of a lofty rusticated ground story ornamented by two stories with small columnar orders ; but there is a richness of effect about these which is quite different from the comparatively cold formalism of the school of Bramante and Palladio. The octagon church of Santa Maria della Salute, also by Longhena, so familiar in views of Venice, with its immense scroll buttresses to the dome, though perhaps somewhat bombastic in style, shows the free hand of an artist who was not fettered by Classic and academic tradition.

In the seventeenth century one Italian artist, Bernini (1598–1680), was supposed by himself and his generation to tower over the whole of his contemporaries in the world of architecture and sculpture ; his journey to France, when invited there by Louis XIV to assist in the design of the Louvre, was a kind of royal progress, the municipalities of the cities he passed through turning out in state to receive him ; and Paris was not behind in this respect. He must have been, in his way, a wonderful man, self-confident and arrogant to a degree, with a superb contempt for all other artists. Posterity, however, has not ratified the judgment of himself and his century. The finest thing he did was the quadrant colonnades in the face of St Peter's, while his most perfect small building is perhaps S. Andrea al Quirinale at Rome. His design for the east front of the Louvre is not perhaps so much pretentious as dull, and very inferior to the one which has been carried out ; it was not accepted, and Bernini shook the dust of Paris from his feet and returned indignant to Italy.

Study of the architecture of the Renaissance would be incomplete without some understanding of the Baroque and the Rococo, the latter hitherto referred to in name only. Following a fashion of regarding these styles merely as terms of description, more or less synonymous, and generally of reproach, it is now generally recognised that each is a fairly distinct and separate style and associated with a particular period.

The Baroque, which originated in Italy towards the beginning of the seventeenth century and reflected elsewhere throughout Western Europe, was really a revolt against the bondage of a classicism that had become

484 Vendramini Palace, Venice (commenced 1481)

485 Pesaro Palace, Venice (*c.* 1650)

486 Staircase, Durazzo Palace, Genoa (17th century)

487 Façade of S. Zaccaria Venice, (*c.* 1515)

488 St Peter's, with Maderna's Façade masking Michelangelo's Design (early 17th century)

489 St Peter's : Choir End, showing Michelangelo's Composition (*c.* 1560)

490 Church of the Superga, Turin (1731)
Juvana, architect

491 Santa Maria della Salute, Venice (1631–87)
Longhena, architect

492 Milan : Palace Marino o Municipale (*top*)

Luca Beltrami, architect

493 Prefeturra and San Croce, Lecce (*c.* 1700) (*middle*)

Zimbalo, architect

494 Venice : Church of St Maria del Giglio (*left*)

G. Sarri, architect

unintelligent in application. It expressed itself in a general relaxation of Classic rule and precedent, a distaste for the severe unbroken horizontal, and a lavish application of exuberant if restless ornament. It was a thoroughly spontaneous movement, and while the later Renaissance architecture was declining into an uninspired dullness from which it could have barely survived, this naïve vitality breathed new life into it, and history is so much the richer for the experience.

Such a revolt against the accepted order of things is not peculiar to this period. One has only to reflect upon say the wonderful false fan vaulting of the Henry VII Chapel at Westminster to appreciate another instance where a feeling that a style drew near to its consumption led the designer to indulge in a fancy which was far less a deceit than a conjurer's entertainment, because it deceived nobody, and far more fresh and entrancing than would have been a vain repetition of precedent. The Gothic Revival again affords an instance where a style degenerating from a fine simple dignity to an object devoid of inspiration found relief by way of revolution. We need deplore none of these signs of a reckless emancipation, neither need we waste valuable mental energy in fruitless conjecture as to what would have happened without the interruption. They stand as landmarks to the periods at which human energies had reached the logical termination of a line of consistent practice, and we may be grateful that, especially in Rome, Venice, and Lecce (493) they left behind buildings of great originality and beauty. Juvara's Superga at Turin (490) may be taken as typical of this theatrical style at its most successful.

Following the Baroque we come to the Rococo. If the former stood for a new freedom, the latter stood for complete abandon, and under its influence Classic precedent was deliberately thrown aside or distorted. Traditional forms were treated with a gaiety and even frivolity that would have shocked a protagonist of the pure Classic school. It was perhaps the natural corollary of the Baroque. A new-found freedom is apt to intoxicate in time. It is natural that a style of such freedom would find easier expression in schemes of decoration than in those of structure, and we therefore find few exteriors that can be described as being in the Rococo style, though individual features such as doorways, etc., can be found designed under this influence. In France the Louis Quinze style of interior decoration is a very charming interpretation of the style, and afforded a refreshing form of treatment to reception rooms where the more severe Classic would be out of tune with gay usage. The main characteristics of the style are an abundance of curves, abrupt scroll-work of a very vigorous type, an avoidance of the hard right angle, and a profusion of festoons of ornament.

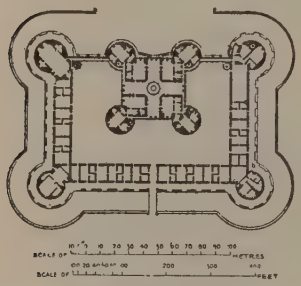
The exuberance of the style measured the short duration which it maintained, and by the end of the seventeenth century it was beginning to give place to a returning restraint and dignity.

The palazzo Marino at Milan (492) is an example of the late Italian Renaissance, showing the Baroque influence in the broken pediments and unusual consoles to the cornice, etc., while S. Maria del Giglio at Venice (494) is yet

another instance of greater freedom in which the central curved pediment flanked by half-broken pediments, the sweeping lines of the inverted curves buttressing the central feature, and the wealth of decoration are very typical characteristics of the style.

The Jesuits' church at Antwerp illustrates fairly well the general tendencies of the Rococo, though it is not quite correct to describe the Jesuit eccentricities as pure Rococo. A reference to Fig. 524 will, however, assist to realise what form a relaxation of Classic practice can take.

It was not until well into the sixteenth century that the influence of the Renaissance movement in Italy began to make itself distinctly felt in French architecture; and in France, Renaissance architecture developed a type of its own, distinct from that of any other country, and, in many of its examples, of very great beauty and refinement.



495. Plan of the Château of Chambord.

To understand the essential nature of the difference between early Italian and early French Renaissance we must take into account the difference between the previous architectural history of the two countries. As has been already pointed out, the true spirit of Gothic architecture had never been assimilated in Italy, and the Classic tradition had always maintained a kind of hold on the Italian mind, so that the Italian architects of the Renaissance, when they turned to Classic example, had no great mediæval style to thrust out of the way to make room for it; they returned, in fact, to the architectural tradition of the greatest age of Italy. But the first French architects who were drawn into the Renaissance movement had behind them the greatest of mediæval styles, which had risen to its noblest triumphs in their country; and they could not at once shake off its influence. Consequently the buildings of the early French Renaissance period (nearly a century later than the Italian) display in the first instance a picturesque mingling of Gothic with Classic details, each treated in a very free manner; or a translation into free Classic detail of designs which in their main character and grouping are mediæval. The château of Ecouen, built in the early part of the sixteenth century, is an example of the former type; it has quite the look of a late mediæval building, though the details of the dormers are Classic. Chambord, commenced in 1526 for Francis I, is an example of the latter. The mediæval château of France, of the exterior of which the restored Pierrefonds furnishes a complete illustration, was a quadrangle with round towers at the angles (495), and often at intermediate points, the upper part projected on machicolations, and the window-openings, of course, as small as possible. At Chambord, as will be seen from the illustration, the round towers remain, but they are decorated with pilasters and panels; the windows, where introduced, are large, filling up nearly the whole space between pilasters and cornice; the

machicolations only survive as a kind of reminiscence. The roof, instead of being practically ignored, as in most of the Italian Renaissance buildings, is lofty, after the manner of a mediæval roof, and covered with a forest of chimneys, dormers, and pinnacles, all of them more or less Classic in detail, but producing a total effect analogous to that of the pinnacled buttresses of a mediæval cathedral. In no single instance, perhaps, have the Mediæval and the Classic spirit so curiously overlapped as at Chambord.

The actual initiation of the Renaissance in France, though it must have come sooner or later, was due mainly to Francis I, who had a passion for building, and some acquaintance with Italian architecture and architects of the period. The special " note " of Francis I architecture is the combination of panelled or fluted pilasters with a window divided up by a stone mullion and transom after the late Gothic manner ; and considering that they derive from different types of architecture, it is wonderful how well the two features go together to form a definitely marked and fairly consistent style. Generally speaking, the window-opening fills most of the space between the pilasters ; sometimes the pilasters are coupled. There are other variations ; the château at Bournazel (1545) shows a more naïve arrangement of wall-columns at a considerable distance from each other, a window with a Classic pediment occupying the centre of each space ; and the château de Bury (1520), one of the best examples of the period, has equally spaced pilasters with every third space occupied by a window ; the traditional circular tower at the angles is retained here, as at Chambord. The early Renaissance châteaux also usually followed the scheme or plan of the late mediæval château, a quadrangle with buildings round it. The word " château " has been retained ever since, although these mansions had ceased to be castles in the old acceptation of the word. It is noticeable that the early French Renaissance architects hardly ever employed the system of a large pilaster order running through two stories ; each story was treated separately, and in this respect their architecture is more logical and rational than much of the Italian Renaissance, and more picturesque in detail, although it did not rise to the severe and scholarly dignity of the best Italian work. In fact, the early period of French Renaissance was a period of experimenting with more or less Classic detail used in a Gothic manner. We see this in the well-known staircase at Blois (499 and 500), where both general design and detail have far more of the Gothic than the Classic spirit ; the dormers at Chenonceaux (502), in spite of the fluted pilasters, have a Gothic freedom of outline, and the finials are crude attempts of a nondescript character. The wind of the Italian Renaissance had blown over France, bringing out a new blossoming in her architecture, picturesque in the highest degree, but uncertain as yet in its standards of design.

Francis I made his first essays in introducing Italian taste into French architecture at Blois, in 1515, and a few years later at Fontainebleau ; but what architects were actually responsible seems very doubtful ; and Fontainebleau, picturesque as it is, is a medley. His more important work was to commence the Louvre, a building which, for scale and architectural importance, is to Renaissance France what St Peter's is to Renaissance Italy, and has a history

even more complicated than that of the Roman cathedral. It was at first intended only to cover the same area as the mediæval castle which it superseded (not a quarter of the area of the present great court of the Louvre), and Pierre Lescot (1510–78) built for Francis I what is now the south-west portion of the quadrangle ; a singularly refined design with two stories and a beautifully decorated attic (496). Under Louis XIII, Lemercier (1590–1654) built the north-west portion, and the whole quadrangle was completed under Louis XIV, the face to the quadrangle by Levau (1612–70), who added a third story in place of Lescot's attic (not to the improvement of the design), and the exterior façades by Claude Perrault (1613–88), whose large order on the eastern face, repeated in pilasters on the south face, is entirely out of keeping with the architecture of his predecessors, with their one-story orders ; showing how the Italian feeling for the predominance of the order was creeping in. The long wing facing the river—again a totally different treatment of Classic materials from the other portions—was built half for Catherine de Medici and the remaining half for Henri IV, but the ascription of the architects seems rather uncertain. The Tuileries, commenced for Catherine de Medici by De l'Orme in 1564, was a block of buildings running north and south, on a site along the line of what is now the Rue de Tuileries, facing the Louvre, but at that time outside the western boundary of the city. De l'Orme (1515–70), who was a man with great constructive ability but little artistic feeling, designed the centre portion, with a single story of rusticated columns and a monstrous and disproportionate attic and dormers in the wings. Pavilions were added by Jean Bullant (1515–78), and another architect—some say one of the Du Cerceau family—continued the block southward and then eastward, to join the end of the long gallery running westward from the central mass of the Louvre. The architect of this portion, like Perrault at the east side of the Louvre, introduced the system of the large order running through two stories, the pilasters being grouped by the introduction over them of alternate angular and curvilinear pediments above the cornice, each spanning over four pilasters. However conventional, this was in itself a fine piece of architecture, though entirely out of scale with its immediate adjuncts ; it was a great deal better than Perrault's contribution to the Louvre ; and though the original work has disappeared, it is fortunate that the design has been religiously preserved in the part of the north gallery of the Louvre built by Napoleon's architects, Percier and Fontaine, in 1806. After the Commune conflagration the cross block of the Tuileries was swept away, and the space left open between the north and south wings. The remainder of the buildings, of inferior architectural interest, are the work of Lefuel and Visconti under Napoleon III (497).

From Francis I down to the end of the eighteenth century French architecture was illustrated chiefly by châteaux, for the erection of which there was an absolute mania, a monarch or a noble often getting tired of one scheme before it was completed, and starting a new one on another site. In the early part of the sixteenth century we still find occasionally a mingling of Gothic detail with the new architecture. In De l'Orme's one picturesque building,

496 Part of West Side of Main Quadrangle of the Louvre (Lescot and Lemercier : late 16th and early 17th centuries) (*above*)

497 Part of the North Wing of the Louvre, erected in 1806 by Percier and Fontaine in imitation of the design of the original South Wing

498 Part of the Modern Louvre, by Lefuel and Visconti (1860) (*left*)

499 Staircase, Château of Blois (early 16th century)

500 Detail of Staircase, Blois

501 The Luxembourg : Part of Interior of the Courtyard, showing Entrance Gateway (*c.* 1620) *De Brosse, architect*

502 Dormer, Château of Chenonceaux (*c.* 1525)

503 The Petit Trianon, Versailles (1766)

Gabriel, architect

504 The Luxembourg, Paris : Garden Front (*c.* 1620)

De Brosse, architect

505 Versailles : Centre Portion of Park Front (1685)

Le Vau, architect

506 St. Eustache, Paris (1532–1642) (*top left*)

507 Porte St Denis, Paris (1674) (*above*)

508 Dome of the Invalides, Paris (1693–1706) (*far left*)

509 Church of Val de Grâce (1645) (*left*)

510 St Vincent de Paul, Paris (1824–44) (*top right*)

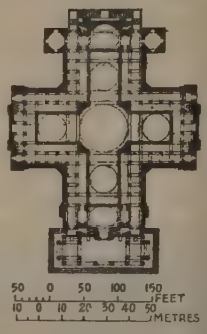
the part of Chenonceaux built on the bridge (464), the pilasters are merely ornaments to the upper windows, the substructure being plain walling ; at Tanlay, in the middle of the century, they occur as half-pilasters on the jambs of the windows, the wall between being plain ; in the façade of a noteworthy house in the Rue des Forges at Dijon (same date), Ionic columns are used in each story with a Corinthian pilaster as a background to them. As we approach the close of the century the designs assume a more conventional Renaissance type ; window pediments and rustication in some cases take the place of orders, or the panelling occurs instead of pilasters ; and the palace of Luxembourg (501 and 504), at the beginning of the seventeenth century, is architecturally an Italian building on French soil ; but it is exceptional. Curiously enough, too, in a house dated 1593 at Amiens, a large opening on the ground floor has a pointed arch, for exactly the same reason as there is a pointed arch in a similar position in the Romanesque church at Pontorson (see page 163) ; the pointed arch being used for constructional reasons, in the one case before it became the fashion, in the other case after it had ceased to be so.

In the seventeenth century the château began to lose its palatial aspect and became more the type of building that we associate with the word " mansion " ; brick came more into use, with stone quoins and pilasters ; the latter were used in a more considered and formal manner, as by people working according to rule. The high-pitched roof cut off flat or nearly flat at the top, was popularised by the elder Mansart (1598–1666), and the younger, Hardouin-Mansart (1646–1708) was commissioned by Louis XIV to carry out the immense palace at Versailles (505), the size of which is alone some title to architectural commemoration. French architecture, as seen here, had lost its special and picturesque character, and was finding a greater dignity in a greater restraint. In the eighteenth century such buildings as Gabriel's École Militaire and Petit Trianon (503), and the buildings at the head of the Place de la Concorde, show a greater dignity as Classic architecture than anything in the vast mass of Versailles ; but it is Classic architecture in the scholarly Italian manner, and not, like the earlier Renaissance, distinctively French, except in the excellence of its design and detail, in which it was superior to anything to be found in any other country at that date.

The early French Renaissance, as already observed, was an age of secular architecture—of château-building ; and in the few churches of this period we find, as at St Eustache Paris (506), at Auxerre, and elsewhere, the mediæval church simply translated into Renaissance detail, flying buttresses and all. But with the later acceptance of the Italian manner came the erection of some very fine churches on entirely Classic lines. The church of the Sorbonne, by Lemercier, and that of Val de Grâce (509), by the elder Mansart, are domed churches of the seventeenth century, completely in the style of the Italian Renaissance. A more important work is the dome of the Invalides (508), by Hardouin-Mansart. As far as the interior architecture of the church is concerned it might be said to be based on St Peter's, but as (at St Paul's) the outer dome is only a timber construction for external effect ; there are, in fact, three domes, the inner decorative dome or ceiling, with a large circular opening at the top

through which is seen the concave of the second dome; above this is the timber construction and the exterior dome. It is not, of course, so monumental a construction as St Peter's, where the same dome is seen both internally and externally; but it achieves the object of giving a soaring effect to the exterior dome without exaggerating the internal height. The plan (511) reminds one of the plan of Batalha (page 225), with the same motive—a domed monumental hall at the end of a three-aisled church. St Sulpice, of which the main portion was built by Levau in the seventeenth century, and the façade by Servandoni in the eighteenth century, is a large and dignified Palladian building, the front of which may be said to be a translation into Classic architecture of the traditional French mediæval scheme of the façade with twin towers. The finest of the Renaissance churches of Paris is undoubtedly Ste Geneviève, now the Panthéon (513), commenced in 1755 from the designs of Soufflot (1709–80). The dome and portico are in the noblest style of columnar architecture, and the lavishness of material with which the vast flanking walls have been built up, without a detail to break their mass except some carved scrolls at the top, shows the mind of an architect who knew the value of mere mass and size as an element of sublimity. The plan (512) is a Greek cross. The interior (514), sadly spoiled as it is now by the medley of modern wall-paintings of all schools and styles with which it has been bedizened (the apse behind what was once the altar is decorated with a huge cavalry charge picture by Detaille), is, in its grand spaciousness and sweep of lines, fully worthy of the exterior.

511. Plan of the Invalides.



512. Plan of the Panthéon.

The French architects of the Renaissance have the credit, also, of having been able to put new life into an ancient form of monument—the triumphal arch. The colossal Arc de l'Étoile (not altogether satisfactory in its detail) belongs rather to the modern period; but the Porte St Denis at Paris, built in the seventeenth century from the design of François Blondel (1617–86), is a really new and perfectly appropriate treatment of the Roman idea of the triumphal arch. The originality of the French architect will be evident if this work (507) is compared with the typical Roman arch, (Fig. 140).

In Germany the Renaissance movement seems to have followed in the steps of French Renaissance rather than of Italian, with the difference that one would naturally expect in the work of a stolid people attempting to adopt the *motifs* of a people of exuberant temperament. The older portion of Heidelberg (*c.* 1560) looks like a clumsy imitation of the Francis I combination of pilasters and mullioned windows, the mullions being decorated with coarsely designed terminal figures (521). This, however, was a more decided adoption of Classic features than is usually found in German buildings

513 West Front (*above*)

514 Interior (*left*)

Soufflot, architect

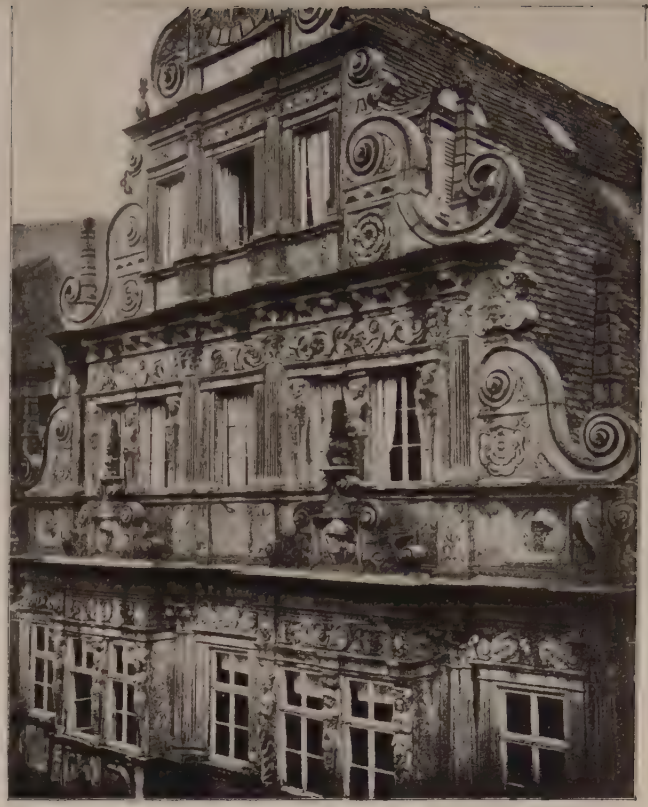
THE PANTHÉON, PARIS (1755)

515 Vierzehnheiligen Church, Bavaria (1746)
J. B. Neumann, architect

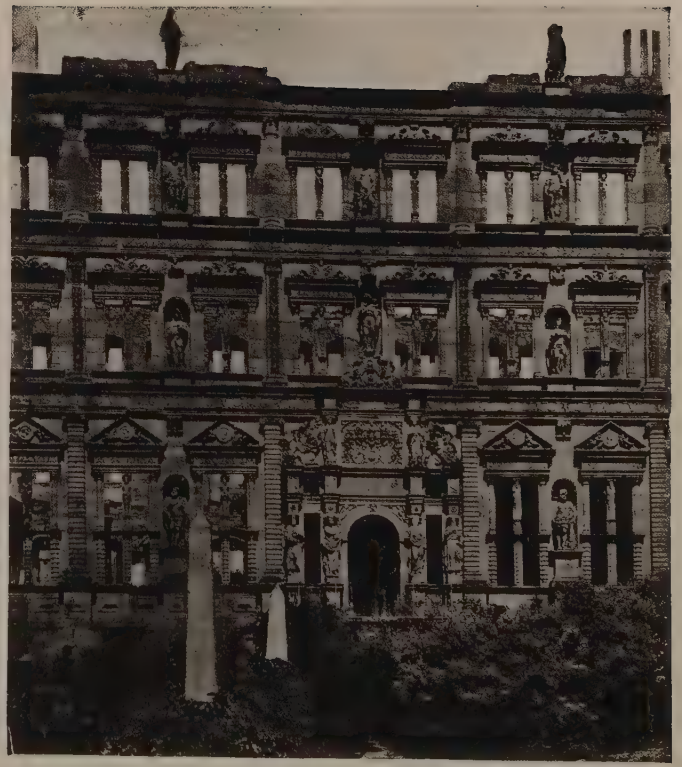
516 Melk Monastery, Austria (*c.* 1700)
Jakob Prandauer, architect

517 Church of "Die Wies," Bavaria (1746–54)
Dominicus Zimmermann, architect

518 Gewandhus, Brunswick
(1592)



519 Gable of a House in Heidelberg (*c.* 1610)



520 Marien-Kirche, Wolfenbüttel (early 17th century) (*left*)

521 Part of the Castle of Heidelberg (1556) (*above*)

of that date, and is in that respect in advance of its time in Germany. The Rathaus at Altenburg, of the same date, is still essentially Gothic in character and composition, with its octagonal flanking tower ; the Renaissance element only appears in the gables, with their small pilasters and large scroll ornaments. But it is, in fact, somewhat difficult to assign any decisive tendency to German architecture in the Renaissance period ; it seems to have varied very much with locality and individual influence. The later work at Heidelberg shows a more Renaissance spirit than the earlier part, but in a rather florid and tawdry manner ; while the portico of the Rathaus at Cologne, with its two stories of orders on pedestals, with round arches between, is almost academic in style, and seems derived rather from Italian than French influence. On the other hand, reminiscences of Gothic survive in the most surprising manner in buildings of much later date than this. A church at Bückeburg, for instance (1613), has aisles defined by Corinthian columns, with the orthodox architrave blocks above the capitals, and mullioned windows of the long three-light German Gothic type, only with circular instead of pointed tracery, and a façade of the most markedly rococo character (524) ; and the Marien-Kirche at Wolfenbüttel (520), about the same date, has buttresses of Gothic plan, but terminating in a frieze and cornice, and the long three-light mullioned window with pointed arches, but with the tracery-bars ragged with ornament in relief. One never knows what one may find in German Renaissance buildings ; it is a period of experiments and vagaries, often crude and coarse to a degree, yet not without a certain picturesque effect, and Gothic feeling is often quite prevalent even where nearly all the details are Classic. One may take as an example the Rathaus at Bremen (1612), with its open arcade in the ground story, its balcony with rococo carved ornament, and its mullioned windows above, with Classic pediment heads, and the transomes placed in the lower instead of the upper part of the window, so that the upper lights are the longest (522) ; an arrangement not nearly so good as the usual one, but which nevertheless interests one from its piquancy. And it can hardly be denied that the total spirit of this building, in spite of its little orthodox pediments over the windows, is mediæval rather than Renaissance. Mediæval in feeling, too, are the frequent high-gabled street fronts, such as that of the Gewandhaus at Brunswick (1592), with four stories each with an order, then an immense gable in several diminishing stages with crude details of pilasters and scrolls (518). The same kind of thing is shown more in detail in the illustration of a house front at Heidelberg (519). There is a certain picturesqueness about it, but after all it is a very immature style of architecture, and not to be compared in standard with the contemporary French work.

Among German buildings which exhibit something of the refinement and sobriety of the Italian and French Renaissance a favourable example is the Gymnasium in the Bank Platz at Brunswick (1592) in which square-headed mullioned windows of the Francis I type are grouped in pairs, with a niche and a statue between each pair (525) ; and one may mention also the Rathaus at Augsburg (1615), a plain building with pedimented windows, somewhat recalling the style of the Farnese palace. But the general

tendency of German Renaissance is to eccentricity and exuberance of ornamental detail, the unquestionable vigour of which hardly compensates for its want of refinement. German Baroque at its finest, however, was a style which produced many masterpieces, as the buildings of Salzburg, Vienna, and Prague will prove. Balthasar Neumann was perhaps the greatest architect of the style and his supreme achievement was the church of Vierzehnheiligen (1746) (515). Contemporary interiors were often creations of extreme artificiality, lightness, and grace; that at the Wallfahrtskirche of Wies, in Bavaria (517), is typical.

Belgian Renaissance may be grouped with German, with the saving clause that there is, generally speaking, a greater refinement of detail in it, and less of licence and crudity. One of the best examples of Belgian Renaissance (a rather exceptional one indeed) is the Town Hall at Antwerp (526), built in the middle of the sixteenth century from the design of Cornelius de Vriendt (1518–75); a building in which the decoration of applied columns on each story is carried out with a good deal of grace and refinement, well contrasted with the plain rusticated ground story which forms a base to the whole. A Renaissance of a very different stamp is illustrated in the church of S. Michael, Louvain (529); an example of the Baroque style which is typical of the Jesuits' churches almost everywhere. Holland possesses a great deal of brick (or brick and stone) architecture of the Renaissance period which is picturesque enough from the painter's point of view, as Van der Heyden discovered, but not much that is of value in the severer architectural sense. The Butchers' Hall at Haarlem (527), of the commencement of the seventeenth century, is a rather celebrated building with a crude picturesqueness about it; but the details are clumsy, and the dormers are quite amusing as a kind of attempt to translate into Dutch the delicate playfulness of the dormers of the early French Renaissance.

When the Renaissance movement penetrated into Spain, it is not surprising that local influences and the tradition of Moorish prodigality of ornament should have given it a special character distinct from that of any other country. The greatest Spanish building in regard to size, however—the Escurial (to take that first)—does not come under this description; it is a cold and correct Classic design, based on a magnificent plan, and all carried out about the same time and as one scheme. In this respect it has every advantage over the Louvre, which is to French what the Escurial is to Spanish architecture, but which was built piecemeal and, moreover, wants the central feature which is furnished to the Escurial by the church (528); yet the Louvre is of far greater interest, simply in virtue of the beauty and refinement of its detail. The adoption of this cold and formal classic for a time in Spain seems to have been largely due to the influence of Herrera (born 1530), who was the favoured architect of Philip II, and gave the tone of Spanish Renaissance during the latter half of the sixteenth century. This phase of Spanish Renaissance may be said to represent the academical correctness of the middle period of Italian

522 Rathaus, Bremen (1612) (*top*)

523 Liebfrauen - Kirche, Dresden (1726–45)

524 Façade of Church, Bückeberg (1613)

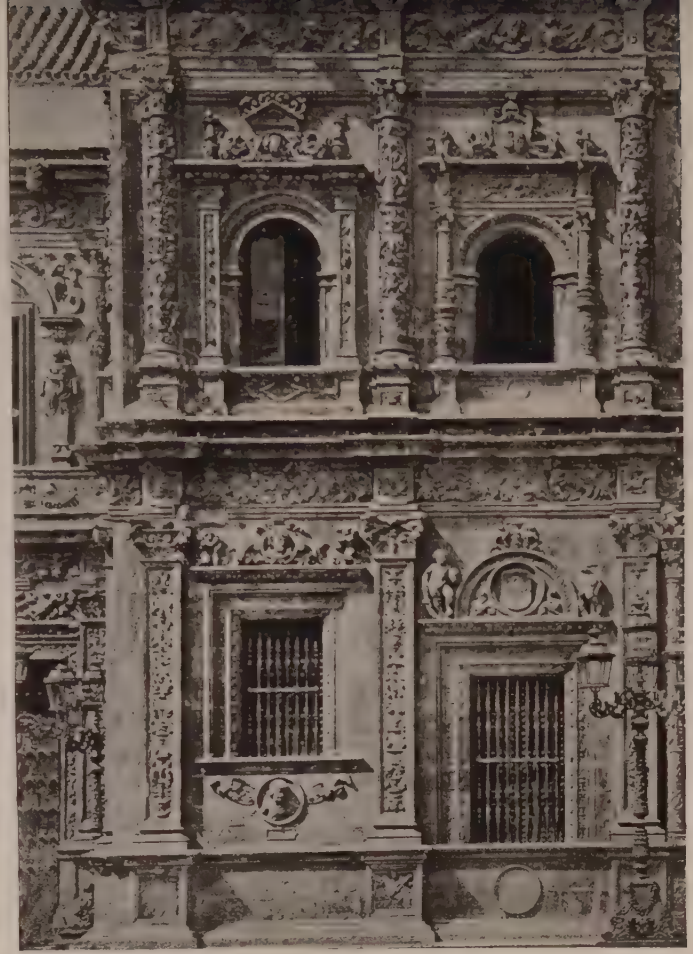
525 Gymnasium, Bank Platz, Brunswick (1592) (*left*)

526 The Town Hall, Antwerp : Central Pavilion (1561–65)

527 The Butchers' Hall, Haarlem (1602) (*above*)

528 Courtyard in the Escurial, with View of part of the Church (*c.* 1570)

529 Church of St. Michael, Louvain (1650–56) (*left*)



530 Town Hall, Seville (Plateresque Style) (commenced 1527)

531 Sacristy, La Cartuja, Granada (Churrigueresque Style) (late 17th century)

532 Centre Portion of Palace of Charles V, Granada (*c.* 1530)

533 Library, Santiago Cathedral (1533)

534 Casa Pilatos, Seville (1500–33

Renaissance without its refinement and nobility of design. But in the earlier period the Spanish Renaissance took forms curiously characteristic, under the influence left behind by Moorish architecture. The courtyard in the house called "Pilate" at Seville (534) is like an Italian cortile with its loggias translated into Moorish. When we come to what can properly be called Renaissance architecture, we find it coloured by the traditions of Moorish exuberance of ornament, the combination resulting in an architecture which has been distinguished as the "Plateresque"—the silversmith's style. A great deal of this work is exceedingly beautiful and picturesque, though it is certainly lacking in architectonic quality; a good example of its general character is seen in the elevation of part of the courtyard of the Town Hall at Seville (530). The Casa de la Infanta at Zaragoza (1550) is a typical example of Plateresque; in the courtyard the lower piers have figures carved on them, the upper ones take the form (frequent in Spanish architecture of this school) of long thin baluster-like columns, suggesting the idea of a well-designed lamp-post; the openings of the lower colonnade are bridged by lintels which start from the capital in a quarter-circle—neither an arch nor a lintel; but these curves with figures carved under them are really a form of the bracket capital, which in its more constructional form the Spanish architects used very well at times, as at the Museum at Guadalajara, the Casa Polentina at Dirla, &c. The Library at Santiago Cathedral (533) is an interesting example of early Spanish Renaissance, in which the sober forms of the arcades and the pedimented windows contrast oddly with the elaborate cresting at the top; it is worth note that here, as in the early Italian Riccardi palace, the openings in different stories are arranged with no reference to centres. In the exterior of the Alcazar at Toledo, somewhere about the same date, the centres are carefully kept, though the architecture is very free in style in other respects.

Some of the churches built in Spain during the Renaissance are very fine in composition and outline, and in the effective and picturesque design of their towers; the inherent feeling for the picturesque in Spain inclining her architects to something quite different from the sober Basilica type of Italy; as we see, for instance, in the tower of the Seo at Zaragoza, and in the picturesque aspiring façade of Santiago cathedral (539). It is to the Renaissance period, also, that we must credit some of the magnificent metal grilles enclosing the choir in a good many Spanish churches; those at Seville and Cuenca are especially fine.

In the seventeenth century, however, there came into fashion in Spain a kind of fantasia of Renaissance architecture, said to be due largely to the architect Churriguera and his sons and successors, and hence called Churrigueresque. This is rococo of the most extreme type, in which all sobriety and dignity of design are thrown over, and structural lines and expression overlaid with a riot of ornament. It has its counterpart in the florid design of the Jesuit churches of the late Renaissance period in Italy and France; but the Spanish architects out-Heroded Herod in this respect, and Churrigueresque (531) is the worst phase that architecture has gone through since the commencement of the Renaissance. It was perhaps owing to a reaction against these extravagances

that the palace at Madrid, which in the first half of the eighteenth century took the place of an older building that was burned down, was placed in the hands of an Italian architect and erected in an academical form of Italian Renaissance. But there seems to have been, during the whole of the Renaissance period in Spain, a certain distinction made in regard to royal palaces, which were supposed to demand a learned academical style ; since, in the very midst of the picturesque varieties of the Plateresque period, the palace of Charles V at Granada (532) was built in the orthodox style, with a rusticated ground story and pilasters, and an Ionic order on pedestals over it. It is a somewhat similar case to that of Marie de Medici insisting on the Italian style for the Luxembourg, in opposition to the French phase of the Renaissance practised elsewhere in Paris.

Portugal has one really important building to show in the academical Renaissance style, the symmetrical group of buildings at Mafra—convent, palace, and church (538) built in the early part of the eighteenth century, and said to be the work of a German architect, J. F. Ludwig. It is to Portugal what the Escurial is to Spain in point of importance, but appears to be a much better and more interesting piece of architecture on the Italian model. One Portuguese building of the fifteenth century deserves notice, the church at Belem, which may be described as Gothic in feeling, but with detail certainly influenced by the Renaissance, though of a very peculiar type and unlike anything else anywhere, and not without interest and merit in spite of its eccentricity.

After Italy and France, England is perhaps the most important country in the history of Renaissance architecture ; the crude Early Renaissance is sharply differentiated from the mature Classic of Inigo Jones. Wren's manner, which followed, was replaced by the Later Palladianism, that shaded into Adam's lighter version and the Greek revival. The influence of the Italian Renaissance was later in making itself felt in England than in France ; in those days of slow communication her insular position put her out of touch with the great architectural movement on the Continent. The Elizabethan style, which heralded the early Renaissance movement, was in some respects individual to England, as elswhere it was a kind of reminiscence of Gothic mingled with a partial adoption of some crude Classic details. In the extensive use of square-headed mullioned windows the Elizabethan is allied to the Francis I style, but there is little use of the pilaster or of any carefully designed and scholarly Classic features ; and there is a good deal of employment of very artificial decorative features—carved " strap-work " or patterns formed by square sinking of spaces ; faceted quoins and masonry features looking as if they were put together like carpentry. It is assumed that a good deal of this kind of work was introduced by Flemish masons, but probably their pattern books were responsible not for the general style but for the crude Classic details, the mullioned windows being the native reminiscence of Gothic. Such a detail as the chimney-piece with terminal figures at South Wraxall (537) (early seventeenth century) shows plainly by the coarse and clumsy design of the figures that no French or Italian influence had a hand in it. Yet the Elizabethan style, especially for mansions and for the brick building that was then coming into fashion, had the great merit of picturesque effect, combined with a certain suggestion of homeliness

535 Horham Hall, Essex (early 16th century) (*top*)

536 Montacute House, Somerset (*c.* 1600) (*middle*)

537 Chimneypiece, South Wraxall (early 17th century) (*left*)

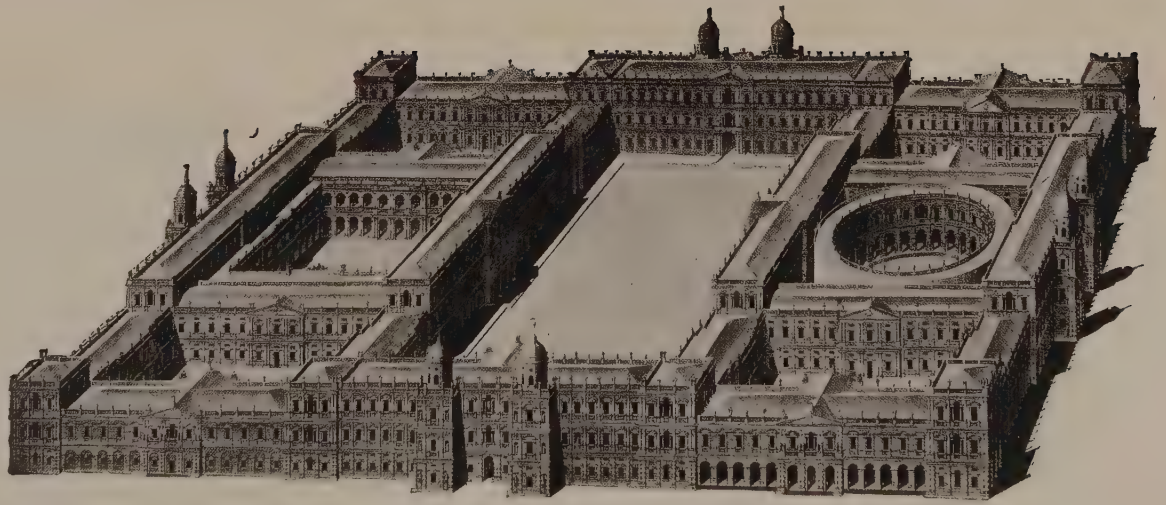
538 Palace at Mafra (early 18th century)

539 Santiago Cathedral (18th century)

540 Tlaxcala: Santuario de Ocotlán (*c.* 1760) (*left*)

541 Taxco: SS. Paisca y Sebastían (1751–58) (*right*)

Diego Durain and Juan Caballero, architects



542 John Webb's projected Design for Whitehall Palace (*c.* 1620)

and repose, which rendered it peculiarly suitable as the architectural expression of a private residence on a large scale ; and perhaps no style of architecture is so closely associated with our idea of the English country house.

In the small country houses of the late sixteenth and early seventeenth century there is a kind of architectural debateable land in which the characteristics of late Gothic and Elizabethan overlap. A house like Horham Hall, Essex, for instance (535), may be said to be a very late Gothic, but the characteristic effect of the large mullioned staircase window is also found in houses that are frankly Elizabethan. Wakehurst retains the mullioned windows and something of the general feeling of Gothic, but the flanking columns and entablature and pediment of the Renaissance have invaded the centre projection in which the entrance is placed. This introduction of Classical features as a framing to the doorway, as if to give it added dignity, is a frequent incident in country houses of this period, when everything in architecture was changing. Wakehurst illustrates the adoption of what was a favourite form of plan in the Elizabethan house—the ⊓ plan, with long projecting wings at each end, and a smaller projection in the centre, in which the entrance is placed. The English country houses of this type can hardly be said to affect the development of architectural style ; they lie apart, as a pleasant backwater out of the main current of architecture ; but there is a quiet and homelike charm about them such as perhaps cannot be found in country houses of the same class in any other time or country.

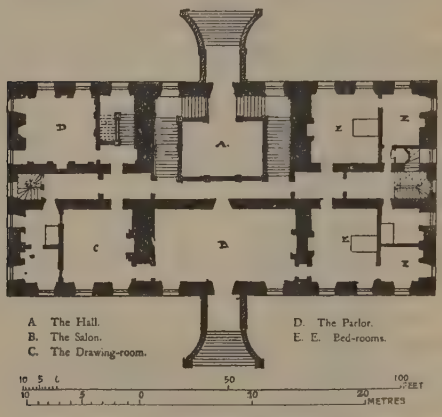
Nor is it easy, in the case of the larger and more important English mansions, to define exactly the border line between Elizabethan and work which has more claim to be called Renaissance. Much that is in the Elizabethan style is post-Elizabethan in chronology. Blickling Hall (1619) is a brick house quite Elizabethan in character, while Kirby (now ruined), nearly thirty years earlier, with its large fluted pilasters and mullioned windows, is distinctly Renaissance in character, and recalls the Francis I style. " Burghley House by Stamford town," with its crowd of architectural erections on the roof in the shape of turrets and chimneys, might have been designed by some one who had seen Chambord ; and the great circular towers at the three angles of Longford House (544) were probably suggested by the round towers of early Renaissance French châteaux ; but before the intermediate buildings were filled in a more classic spirit had supervened, shown in the fluted columns on the first story, and the terminal figures, between mullioned windows, in the second story. Longleat (1567–69), with its three stories of pilasters enclosing mullioned windows, looks like an attempt to reproduce the Francis I style, with nothing like the dignity and refinement of its models, though it is attributed to an Italian architect. Montacute (1580–1600) (536), however, may be taken to typify the new style as it had established itself in England, while the Saloon at Knole (*c.* 1605) (466) shows how the Italianate manner was applied to an English interior.

Thus the early Renaissance took root in England, though so far without full understanding of its meaning. It was the genius of Inigo Jones (1573–1662) that first grasped what the Renaissance really meant, or could be made to mean, and imparted to English work of this school real breadth, grandeur, and unity

of style. He was the most notable figure that had so far appeared in English architecture.

Of the domestic buildings ascribed by Webb to Inigo Jones in his *Vindication of Stone-Heng Restored*, there remain the Banqueting House at Whitehall (completed 1622), and the Queen's House at Greenwich ; both Italian in elevation and characterised by suavity and a fine sense of proportion. The designs for an enormous palace at Whitehall (542) have been found to be the work of John Webb, who " received His Majesty's (*i.e.* Charles I's) command to design a palace at Whitehall," which he did, " until His Majesty's unfortunate calamity caused him to desert."

Among the smaller works that Jones actually carried out, everything bears the impress of his strong hand, of his sense of breadth, simplicity, and congruity of detail—" solid, proportional, according to the rules, masculine, and unaffected "—to use his own words as to what architecture should be. The portico of Covent Garden Church, conscientiously rebuilt after his design, impresses one with these very qualities. Henceforth English Renaissance was started on a new path, and with a definite and consistent aim. Inigo Jones's influence affected the whole course of English architecture for a century and a half after him.



545. Plan of Coleshill.

The Classic influence was at first very restricted, and a typical Early Renaissance mansion like Aston Hall was erected at the same time as the Banqueting Hall. In domestic work for about half a century a phase usually attributed to Wren's influence prevailed ; it shows to some extent a derivation from Dutch sources, though nationalised. The group of Palladian architects of the mid-eighteenth century reverted to Inigo Jones's manner and reckoned him their master.

One point connected with the work and influence of Inigo Jones is perhaps the change in the typical plan of the English mansion at this time. In the earlier Renaissance period the plan of a great house was usually the quadrangle enclosing a central courtyard, or the ⊓ type of plan already referred to. In the two or three large houses built during the second half of the seventeenth century, such as Coleshill (543 and 545), designed by that interesting figure, Roger Pratt, the type of the solid rectangular block, without any central court, was adopted. To John Webb, described so summarily by Evelyn as " Inigo Jones's man," justice has hardly been done. Thorpe Hall, built by him about 1656, is a solid oblong house in the new style, characterised by a widely projecting cornice, hipped roof, and rectangular windows, having, as at Coleshill, servants' quarters in the basement.

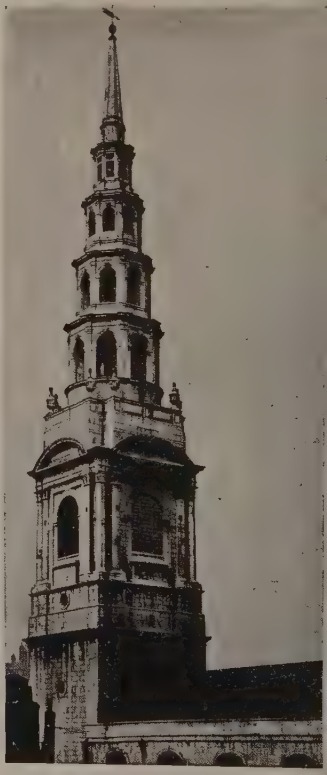
546 St. Paul's Cathedral (1675–1710) (*left*)

547 Trinity College Library, Cambridge (1673)
Wren, architect

548 Greenwich Hospital (completed 1705)
Wren, architect

549 St. Mary-le-Bow, Cheapside (1680)
Wren, architect

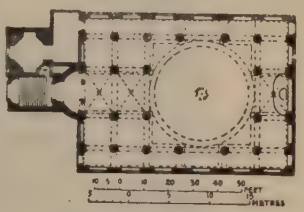
550 Christ Church, Spitalfields (1723–29)
Hawksmoor, architect



551 St. Brides, Fleet Street (1680–1700)
Wren, architect

A later development, as at Castle Howard (Vanbrugh) (554) was to have subsidiary wings tacked on to the central block, or (as at Kedleston and elsewhere) connected with it by curved corridors or colonnades. The staircase at Ashburnham House (556) affords sufficient evidence of the grace and refinement of interior design at the commencement of the Later Renaissance.

Some sixty years after Inigo Jones came his distinguished successor, Wren (1632–1723), who was in the first instance an amateur, having been celebrated for his astronomical and mathematical acquirements before accident of circumstance and opportunity led to his becoming an architect. Wren was a born architect, to whom the most appropriate treatment of a plan and a site seemed to come as a matter of instinct; and who, owing to the fire of London, had an opportunity such as falls to the lot of few. What Inigo Jones might have made of such an opportunity one can only conjecture; it was the fortune of Wren to have the greater opportunity; hence his name and work are widely known, while that of Inigo Jones is little familiar except to students of architecture. Wren, as Professor Lethaby has happily put it, "saw exactly what could be done with the Renaissance box of bricks," and in his numerous city churches he put them together with remarkable variety and effect in the use of these conventional materials. His steeples (549, 551) are especially good; and the manner in which he varied the plans of a number of churches, all in the same style and for the same purpose, is one of his great merits; nowhere better seen than in his beautiful plan of St Stephen's, Walbrook (552), the basis of an equally beautiful interior design. The dignity which he could impart to what may be called the stock materials of his architecture is well illustrated in Greenwich Hospital (548) and in the Trinity College Library (547). Wren's great building, St Paul's (546), deserves the praise that has been lavished on it. The exterior disposition of the superimposed orders is a touch of genius that lends harmony between the wall treatment and the peristile of the drum of the dome. A comparison between this and the Panthéon at Paris will show how very much more does unison result from Wren's treatment.

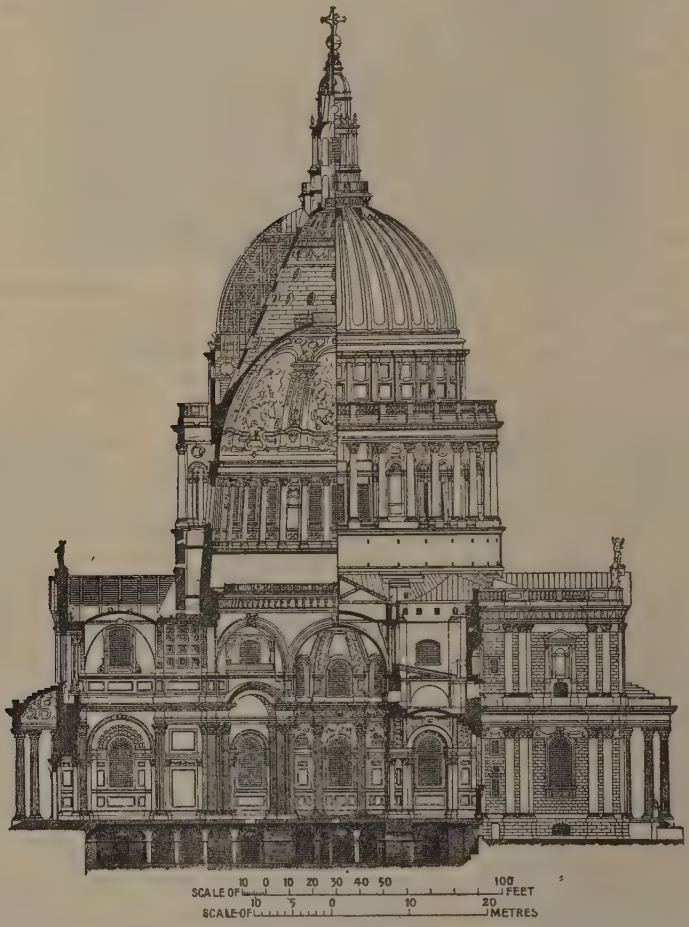


552. Plan of St Stephen's, Walbrook (1672–1679).

The dome itself is of stone, and of proportions most satisfying in internal effect (553). Above it is raised the most graceful and dignified Renaissance cupola in the world. There is really no other method by which complete satisfaction to the eye may be found both from within and from without. The whole exterior composition has a noble effect; and the western cupolas, for beauty and fitness of design, may well vie with the lantern of St Peter's.

Hawksmoor (1661–1736), who was a pupil of Wren had, perhaps, as much originality as had his master, and every one among his few churches is marked by a strong individuality of conception; St Mary Woolnoth and Christ Church, Spitalfields (550), are good examples. Vanbrugh (1666–1726),

dramatic author and man of fashion, was another of the inspired amateurs, remarkable rather for his bold sense of scale (a fine architectural quality) than for its necessary complement, a sense of detail; he is commemorated by Castle Howard (554) and the vast and rather clumsy pile of Blenheim; Seaton Delaval (555) gives a good idea of his powerful way of handling his



553. Half Section and Half Elevation of St Paul's Cathedral.

materials. Thomas Archer (1675?–1743), who is said to have been Vanbrugh's pupil, should be remembered for his admirable cupola of St Philip's, Birmingham, more like Wren's grace of line than anything else that is not Wren's, and as unlike Vanbrugh as possible. Among the later men who are of some importance are Gibbs (1682–1754), who built St Martin-in-the-Fields and the Radcliffe Library at Oxford, and Kent (1684–1748) famous for Holkham Hall, Norfolk, and for Devonshire House, London, in which he collaborated

554 Castle Howard (*c.* 1700) (*top*)
Vanbrugh, architect

555 Seaton Delaval (1720)
(*middle*)
Vanbrugh, architect

556 Staircase, Ashburnham House
(*c.* 1662) (*left*)
Webb, architect

557 American Colonial : Horn Quarter, Virginia (*c.* 1750)

558 Dutch Colonial : Morgenster, Cape Colony (1786)

559 Middleton Place, Charleston, South Carolina. (Built 1738, enlarged 1755)

560 Edgar J. Kaufmann House, " Falling Water," Bear Run, Pennsylvania
Frank Lloyd Wright, architect, 1936

561 A Greek Revival Villa at Cheltenham (*c.* 1810)
Papworth, architect

562 An Egyptian Revival Library at Plymouth (*c.* 1824)
Foulston, architect

563 Bedford Square, London (*c.* 1780)
Leverton, architect

564 The West Mall, Clifton, Bristol (*c.* 1810)

with the Earl of Burlington, an amateur and his patron. Devonshire House (568) now (alas!) no longer standing, illustrates perhaps the limit of restraint to which the direct Wren tradition might be refined. In somewhat similar strain and of much the same period, is the Foundling Hospital, by Thomas Jacobson, now to be demolished.

To continue the list of later Renaissance architects, we have Wood (1704–54), to whom Prior Park and the stately streets of old Bath are due; John Vardy (died 1765), whose fine and well-proportioned façade of Spencer House is one of the best pieces of late Renaissance in London; Robert Adam (1727–92), who may claim to have originated a style of Classic detail of his own, pretty and graceful though not monumental (465); and Chambers (1726–96), learned and correct, whose river front of Somerset House (565) is a piece of architecture worthy of its position, and must have looked still finer when, as designed, it rose direct out of the river, before the Thames Embankment was made. All these were men who kept up, with more or less success, the Italian type of Renaissance architecture, for which Inigo Jones showed the way. And one other should be mentioned, George Dance the younger (1741–1825), who by a stroke of real genius evolved that grim and impressive piece of architecture, old Newgate (567), now unfortunately removed. Sir R. Blomfield has shown reason to think that this remarkable design, which stood alone in modern architecture, was inspired by some of Piranesi's drawings.

An important phase of the development of architecture during the eighteenth century occurs in the colonial empires of the European powers. Although some two centuries had elapsed since the inauguration of these empires, it had taken this time for monumental architecture to become established in the colonies. The most important of these colonial styles is that of New Spain. The period was the heyday of the Baroque, the exuberance of which seems to have found no difficulty in overflowing into the New World, there to be adopted as the national style. In Mexico particularly, a fine series of eighteenth-century Baroque churches (540, 541) echo the architecture of the mother country. Even the large farmhouse or ranch which formed the great house of the Spanish colonial landowner generally showed some traces of Baroque in the lines of its gables and elsewhere within the arcades of the cloistered courtyard around which it was built. Although the more monumental buildings, such as the churches, were built of stone wherever procurable, sun-baked bricks, thickly whitewashed to make them look like new stone, took its place in domestic buildings. The ornament was applied in stucco.

A humbler Baroque, also founded upon brickwork, began at this time to appear in the Dutch colonies round the Cape of Good Hope. Here, however, the farmhouses were of the simple rectangular type common to western Europe. Fanciful gable silhouettes indicated the strong Baroque influence (558). Whitewash played an important part in the gay effect of the whole building. Cape Dutch architecture is entirely domestic; the Protestant Dutch founded no great churches. The whole style is much humbler than the magnificent Baroque which grew out of the riches of the New World.

By the middle of the eighteenth century, building was in full swing over the English colonies in North America. Nothing on a monumental scale, however, was being erected, the architectural style being based upon that domestic form of the English Renaissance which is known as the Georgian (559). The principal difference between the monumental style and its humbler offspring lay in the roof pitch. In the larger buildings the roof was usually covered with lead and thus could be kept flat enough to be hidden, in proper Renaissance fashion, behind a parapet. The Georgian builders, however, having to be content with less efficient roofing materials such as ordinary tiles, were forced to pitch their roofs more steeply in order to throw off the rain and snow. This was not the type of roof with which the Renaissance architects usually associated a parapeted top to the wall upon which it rested. Lead box-gutters, essential where a parapet is employed, were costly and specialised plumbing items. Georgian builders, therefore, usually contented themselves with letting their roofs overhang the wall-face in the form of eaves. To cover the ends of the rafters, wooden copies of the stone Renaissance cornices were provided. By the end of the eighteenth century, when soft wood was being employed in place of the oak which had hitherto been the universal building timber, white paint came to be used to protect external joinery. The white-painted cornice is perhaps the most characteristic architectural feature of the Georgian colonial house, in other respects so plain and simply designed. The entrance front of a Georgian house is usually distinguished by a fine doorway : generally a copy, in painted wood, of a Baroque design such as would not be unsuitable for a much larger building. Georgian architecture spread to all types of buildings. The rows of tall houses common to the streets of Continental towns became, in this country, " terrace " compositions of Georgian houses, each with its good doorway (563). As the eighteenth century progressed, the style became refined into that known as the Regency which favoured, amongst other architectural improvements, the covering-up of the brickwork of which most Georgian houses were built by plaster which produced some semblance of stone construction (564).

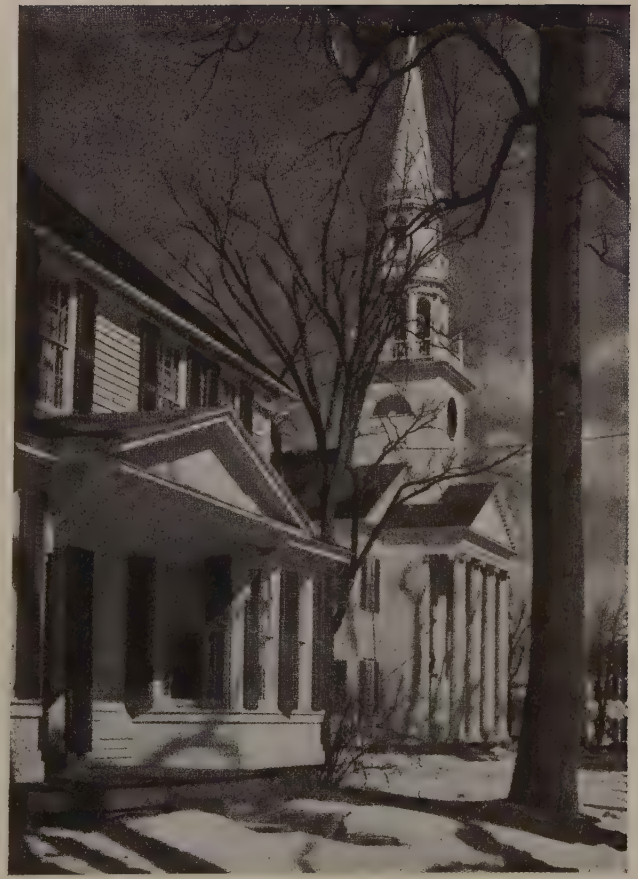
The earliest buildings erected by British colonials in North America were also of brick ; some of this was actually imported from this country. The urgent need for houses, however, and the plentiful supply of timber available, caused this to become the universal building material. Not only houses, but even such important public buildings as churches, were constructed of timber framing. The external covering was of boarding, laid horizontally and overlapping to keep the rain out. The whole building was painted white so as to give the appearance of being a stone structure. This white-boarded architectural style, which achieved considerable distinction, is known as the " Colonial " (557). Although the designers of some of the early wooden churches endeavoured to introduce Baroque detail into the work, the material was hardly suitable for the purpose, and the style settled down to a simple classic based on the Roman Doric Order. The principal feature of most buildings was the portico with its very attenuated columns made out of the solid trunks of trees. What might have appeared an ugly distortion of the established

565 Somerset House (1776–86)
Chambers, architect

566 Houses of Parliament, London (*c.* 1840)
Barry, architect

567 Old Newgate Prison (1770)
Dance, architect

568 Devonshire House—South Front (1734)
Kent, architect



569 Church on the Green, Litchfield, Connecticut,
probably designed by Levi Newell 1828–29

570 The State Capitol, Nashville, Tennessee
William Strickland, architect 1855

proportions of the Order was actually utilised by the skill of the designers to form a feature unrivalled for grace and beauty in the history of columnar architecture. It was this Colonial architecture which by the end of the eighteenth century was spreading through the eastern parts of North America, echoing, in its raceful white compositions, the delicate Georgian style of the mother country.

A.D.	EVENTS IN GENERAL HISTORY.	ITALY.	FRANCE AND BELGIUM.
1400			
	Alberti born.		
		Pazzi Chapel, Florence. [ence.	
	Cosmo de Medici rises to power in Flor- [ence.	Riccardi Palace. Santo Spirito, Flor- Dome, Florence Cathedral.	St Pierre, Louvain.
1450	Bramante born.	Pitti Palace.	
	Leonardo da Vinci born.		
		Rucellai Palace.	
	Lorenzo de Medici rules Florence.	Renaissance Façade, Certosa, Pavia.	Town Halls, Louvain and Brussels.
	Michelangelo born.		
		S. Andrea, Mantua.	
	Raphael born.	Vandramini Palace, Venice.	
		Strozzi Palace, Florence. [Milan.	
	Venice the commercial centre of Europe.	Cancelleria Rome, Dome, S. Maria,	
	[Moors expelled from Spain.		
1500	French invade Italy.	Palazzo Vecchio, Florence.	Palais de Justice, Rouen, Château, Blois.
		St Peter's commenced. Villa Papa [Giulio.	North Spire Chartres. West Front, Troyes.
	[King of England.	Tarugi Palace, Montepulciano ?	West Front, St Ouen. S.W. Tower, Rouen.
	Francis I, King of France. Henry VIII,	San Zaccaria, Venice.	Château of Ecouen.
	Leonardo da Vinci goes to France.		Tower, Antwerp Cathedral. Staircase,
	Palladio born. [Julius II, Pope.	Farnese Palace. Palazzo Massimi.	Château, Chambord. Fontainebleau. [Blois.
	Herrera born.	Pompeii Palace, Verona. Library,	St Eustache, Paris. Château, Bournazel.
		Scuola di San Rocco, Venice. [Venice.	
1550		Courtyard, Ducal Palace, Venice.	Town Hall, Antwerp.
	Philip II in Spain.	San Giorgio, Venice, begun. Grimani	
	Catherine de Medici. Queen Elizabeth.	St Peter's Dome. [Palace.	Transepts, Beauvais. Palace at Sens.
		Palazzo Chiericate, Vicenza.	New Wing at Chenonceaux (de l'Orme).
			Tuileries (de l'Orme).
	Battle of Lepanto. Inigo Jones born.		
		Redentore, Venice.	First portion of Louvre quadrangle.
		Borghese Palace. Vatican obelisk	
	Henri IV of France. [Bernini born.	[set up.	
1600	Marie de Medici, Queen of France.	Palazzo Reale, Naples.	South galleries of the old Louvre.
		San Giorgio, Venice, completed.	Jesuits' Church, Antwerp (late Gothic).
	Thirty Years' War commenced.	Maderno's nave to St. Peter's.	
			Luxembourg, Paris.
			SS. Paul and Louis, Paris. Church,
	Wren born.		Church of Val de Grace. [Sorbonne.
		S. Maria della Salute in progress.	North-west part of Louvre quadrangle.
	Louis XIV. in France. Civil war in Eng-		
1650	Venice at war with the Turks. [land.	Pesaro Palace, Venice.	
	Cromwell in power in England.	Colonnades before St Peter's.	St Roch, Paris.
		Trevi and Navona Fountains, Rome.	Château de Maisons.
	Bernini goes to Paris.		
			Louvre : great quadrangle completed.
			Versailles : centre of Park Front.
	Revocation of the Edict of Nantes.		
	[William III in England.		
1700			
	Queen Anne.		Church of the Invalides.
	Battle of Blenheim. Act of Union of		
	Regency in France. [Great Britain.		
		Façade, S. John Lateran, Rome.	Façade, Auch Cathedral.
			St Sulpice, Paris.
	Frederick the Great (accession).		Façade, St Roch, Paris.
1750			
	Seven Years' War.	Caserta Palace, Naples.	Panthéon, Paris.
			École Militaire, Paris.
			Buildings in Place de la Concorde.
			Petit Trianon, Versailles.
	American War of Independence.		
	French Revolution. [Genoa.		
1800	French take possession of Venice and		
	Napoleon, Emperor. Austerlitz.		Modern Louvre (Percier and Fontaine).
	Trafalgar.		Madeleine commenced.
	Waterloo. Treaty of Vienna.		Bourse, Paris.
			St Vincent de Paul, Paris.
	Reform Bill passed in England.	San Carlo, Milan.	Arc de l'Étoile completed.
	Queen Victoria.	S. Paolo, Rome, rebuilt after fire.	Madeleine completed.
1850			

ARCHITECTURAL MONUMENTS.

GERMANY.	SPAIN AND PORTUGAL.	ENGLAND.
Church at Annaberg. West Front, Ratisbon.	Seville Cath. Lantern, Valencia. West Front, Toledo. Nave, Gerona. Burgos, West Front in progress.	Nave, Canterbury. Cloister fan vault, Gloucester.
Choir, Salzburg. St Stephen, Vienna, completed. Tower, Erfurt Cathedral.	Church at Belem.	St George's Chapel, Windsor.
Heidelberg (Frederick II).	Leaning Tower, Zaragoza. Casa Pilatos, Seville. New Cathedral, Salamanca. Town Hall, Seville. Palace of Charles V, Granada. Library, Santiago Cathedral. Segovia Cathedral in progress. Burgos: crossing and lantern.	Henry VII Chapel, Westminster. King's College Chapel, Cambridge. Horham Hall, Essex. Hampton Court (Wolsey).
Schloss, Stuttgart. Portico, Rathaus, Cologne. Gewandhaus, Brunswick. St Michael, Munich.	Casa de la Infanta, Zaragoza. Alcazar, Toledo. Escuria commenced.	Longleat. Gate of Honour, Caius [College. Burghley House. Longford House. Wollaton Hall.
Heidelberg (later Renaissance). Church at Bückeburg. [Gothic). Jesuit Church, Cologne (late Marien-Kirche, Wolfenbüttel.		Hardwicke Hall. Coleshill. Hatfield House. Blickling Hall. Banqueting House, Whitehall. St Paul's, Covent Garden. Heriot's Hospital, Edinburgh.
Palace, Schonbrunn, Vienna.	Cathedral, Valladolid. Cathedral of the Pillar, Zaragoza. Sacristy, La Cartuja, Granada.	Central spire of Lichfield rebuilt. Library, Trinity College. St Stephen, [Walbrook. Hampton Court (Wren). Castle Howard.
Zwinger Palace, Dresden. San Carlo, Vienna. Liebfrauen Kirche, Dresden.	Palace at Mafra (Portugal). Royal Palace, Madrid. Palace, Aranjuez. Towers, Santiago Cathedral.	Greenwich Hospital. [menced. St Paul's completed. Blenheim com- Seaton Delaval. Spitalfields Church. St Martin-in-the-Fields. Radcliffe Library, Oxford.
Palace, Potsdam. Brandenburg Gate, Berlin.	Museo, Madrid.	Old Newgate. Somerset House. The College, Edinburgh. Bank of Ireland, Dublin.
Ruhmes-Halle, Munich. Berlin Museum. Nikolai Church, Potsdam. Pinakothek, Munich.		National Gallery, Edinburgh. Bank of England. Hyde Park Screen and Arch. St Pancras, London. National Gallery, London. Houses of Parliament. St George's Hall, Liverpool.

CHAPTER VIII

THE NINETEENTH CENTURY AND MODERN TIMES

The nineteenth century is almost a period to be considered by itself—a modern period within the modern period, since it has been a good deal characterised, especially in England, by new departures and new revivals. Taking England first, the early part of the century was marked by a Greek revival ; a revulsion from the austere and rather prim simplicity to which the Renaissance had been reduced in the Georgian era, when hardly anything of Renaissance architecture was left except the Classical cornice and the symmetrical arrangement of windows. " Back to Greece " was the cry, without any consideration as to whether the climate of England and the conditions of modern life were suitable to Greek architecture ; and one of the earliest results was the formation (1822) of the steeple of St Pancras' church by Inwood's simple process of putting imitations of two small Greek buildings one on top of the other, above a main portico of Ionic columns. Sir John Soane's (1753–1837) earlier treatment of the Bank of England was much better than this ; having to provide for a low building with all the windows opening on the interior courtyard, the employment of a large one-story order as a means of giving decorative effect to these blind walls was a fine conception ; and at all events the building looks like a bank, and could hardly be taken for anything else. Then we had Wilkins' National Gallery and University College, both with admirable details, though in either case the dome is hardly worthy of the refined details and splendid proportion of the main composition. Then Smirke (1781–1867) carried a great Ionic colonnade all round the centre and wings of the British Museum, which has been rather harshly criticised as mere waste of space, but it has at least the excuse of providing a dignified and impressive frontispiece, significant of the great purposes of a building which is largely occupied with the preservation of the remains of Classic antiquity. Decimus Burton (1800–81) will always be remembered by his Constitution Hill arch and Hyde Park screen ; Basevi's Classic portico to the Fitzwilliam Museum at Cambridge (572) is a fine work of its class ; and Cockerell (1788–1863), who in his exquisite refinement of taste was like an ancient Greek come to life again in modern times, produced two or three façades for the branch Banks of England—one especially in Liverpool (580)—the study of the details of which is a liberal education. The great building of the Greek revival is St George's Hall at Liverpool (571), by Elmes (1814–47), who was as much a born architect as Wren, and whose early death was a great loss to English architecture. St George's Hall, Greek externally and Roman in the interior of its great hall, is a noble conception, and contains moreover a certain originality in portions of the exterior, which may be described as Egyptian *motifs* translated into Greek form ; it is true that the interior is very badly

571 St. George's Hall, Liverpool (commenced *c.* 1845) *Elmes, architect*

572 Fitzwilliam Museum, Cambridge (1845). *Basevi, architect*

573 Bank of Ireland (1792–94) *(above)*

574 National Gallery of Scotland, Edinburgh (1850–54)

575 Houses of Parliament, Vienna (1883)

576 The Berlin Museum (1824–28)

577 The Ruhmes-halle, Munich (early 19th century)

578 The Nikolai Church Potsdam (1830–37)

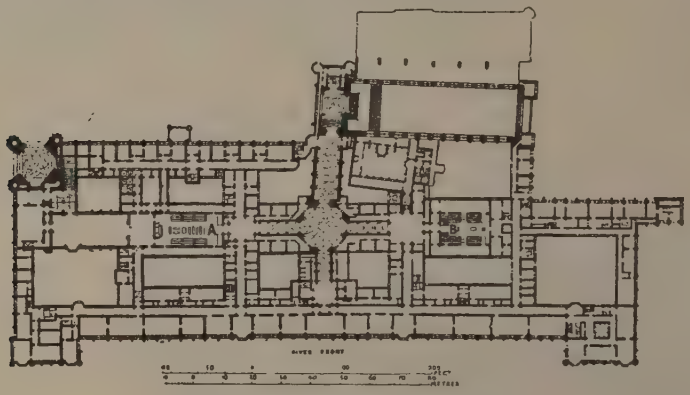
planned for its purposes, and the corridors lamentably deficient in light; but in those days, and in Elmes's mind certainly, that was a matter of quite secondary consequence provided that a grand architectural effect were obtained; and perhaps, for architecture, that extreme is better than the opposite extreme of ultra-utilitarianism. The Town Hall at Birmingham, by J. Hanson and T. Welsh, is a fine though less original adaptation of the Classic temple form to a modern civic building. Edinburgh, too, self-styled "the Modern Athens," took up the Greek movement with enthusiasm, and even commenced an imitation Parthenon on Calton Hill, the few columns erected still standing as a sad mockery of mistaken efforts; but some of the Edinburgh buildings, such as Playfair's Royal Institution and National Gallery of Scotland (574), are as good of their kind as anything of the Greek revival period; and the same praise may be given to the Dublin Parliament House (now the Bank of Ireland), by Gandon (1742–1823), a pupil of Sir William Chambers (573).

The Gothic revival in England, a little before the middle of the century, was more or less acted on by an ecclesiastical or religious revival—at all events the architectural and religious movements went hand in hand, and the result was a widespread erection of churches in imitation of those of the mediæval period, and a drastic restoration of the cathedrals; in both classes of operations Sir Gilbert Scott (1811–78) was the largest operator. He has been somewhat too harshly judged, in recent days, for his restorations to the cathedrals; but at the time, it was supposed by every one to be the right thing to do; all that can be charged against Scott is that he did not know better than his generation; and if restoration was to be sanctioned, he certainly understood his business thoroughly. His churches, it must be admitted, are quite uninteresting now; the stamp of imitation Gothic is over them all. Pugin (1812–52), that impassioned modern mediævalist, was also a leading influence at the outset of the Gothic revival, and had the faculty of imparting a great impression of height and scale to the interiors of his plastered churches with their "half-baked chalk rosettes," as Bishop Blougram expressed it. Street's (1824–81) churches have more individual character than Scott's, and Butterfield's (1814–1900) still more so; perhaps his All Saints', Margaret Street, is the one Gothic revival church which is still as interesting, externally at least, as when it was built. Burges (1827–81), who took more to the French school of Gothic, also stamped his revived Gothic buildings with a character of his own. Street's Law Courts, a building marked by much vigour of detail, though (like St George's Hall) very badly planned, stands as a defiant and rather bewildering memorial of the Gothic fervour of its day.

The greatest modern Gothic building in England, or in the world, the Houses of Parliament (566), stands apart, as owing its style to influences outside of the Gothic revival movement, which, in fact, it rather preceded. The Tudor style appears to have been dictated to the architect mainly for historical reasons, as a typical English style; perhaps also owing to the proximity of Henry VII's chapel. Sir Charles Barry (1795–1860), who was unquestionably the greatest English architect since Wren, with the same capacity as Wren for intuitively grasping the heart of an architectural problem, has the merit

of having produced, though working in a style forced upon him and with which he was not in sympathy, (he was assisted by Pugin, who was responsible for a good deal of the Gothic detail, especially internally), one of the grandest and most picturesque groups of architecture in the world, based on a plan (579) so fine and effective that it has been copied again and again in buildings for a similar purpose, notably in the Budapest Parliament House, which is practically a reproduction of Barry's plan. Barry's other works were mostly large mansions in the Renaissance style, and the fine Town Hall at Halifax, in which he translated the Gothic spire into Classic form with remarkable effect.

In England, the period extending from the Gothic revival up to the end of the nineteenth century was one of continual experiment and changing fashion, in which it is difficult to trace the common drift of architectural



579. Plan of the Houses of Parliament.
A. The House of Lords. B. The House of Commons.

development. It is, however, impossible to ignore such a period, producing as it did many outstanding figures to whose influence the more coherent tendencies of to-day must be largely due.

France has had too much of the sense of tradition in architecture to be taken captive by revivals. There is the great modern Gothic church of Ste Clotilde at Paris, about the middle of the century, but there has been no Gothic revival on a large scale in France. There was, under the first empire, a certain tendency to a Greek, or we should perhaps rather say a Roman, revival, illustrated in such columned structures as the Bourse and the Madeleine, by Brongniart and Vignon respectively ; and the stupendous Arc de l'Étoile, in which the general effect is better than the details, with the exception of Rude's grand sculpture. But there was no general movement like the Gothic revival in England. There was for a time a certain tendency to build churches with details founded on Byzantine suggestions, which were not successful ; the attempt was not in harmony with the French genius, which, in spite of the fact that France was the cradle of mediæval architecture, is now essentially

580 Branch Bank of England, Liverpool (1845)

581 Houses of Parliament, Berlin (late 19th century)

583 Stockholm Town Hall (1911–23) (*above*)

584 Petit Palais, Paris (opened 1900) (*top left*)

585 The Law Courts, Brussels (1866–83) (*middle left*)

586 London County Hall (1912–22) (*left*)

Classic in its tendencies. The great church of the Sacré Cœur, by Abadie (1812–84), which overlooks Paris from the hill of Montmartre, is (like the Roman Catholic cathedral in London) a frank adoption of Byzantine architecture, and a grand piece of work as such; but it is exceptional. The characteristic successes of the French architects of the century in church architecture are to be seen in such buildings as the church of La Trinité (592), by Ballu (1817–85), in which a Gothic type of composition has been most successfully translated into Classic detail; in Baltard's (1805–74) domed church of St Augustin (591), where by a happy recognition of the fact that the streets which limit the site meet at an acute angle, the exterior lines of the building are made to expand from the entrance front to the base of the dome; and in Hittorf's (1793–1867) fine and severe basilica church of St Vincent de Paul. The new Hôtel de Ville at Paris, built after the Commune, keeps a good deal to the style of the earlier French Renaissance being partly influenced by the fact that the design of the earlier building is reproduced in a portion of the new one. At present the tendency of French architecture is towards the use of the Classic order, in large buildings, combined with a modern school of decorative detail which tends to be a little too florid. The Opera House (590), by Chas. Garnier (1825–98), is a fine and richly handled building, redolent (as one may say) of the Second Empire. The Musée Galliera at Paris (593), by the late M. Ginain (1825–98), is a little gem of modern Classic architecture, treated in a style distinctly French and with perfect good taste and refinement of detail. Speaking generally, however, what nineteenth-century French architecture needed was a greater simplicity and reticence in decorative detail. But France is the only modern country which seems to have anything like a recognised tradition and a consistent purpose in architecture.

Germany anticipated the Greek revival, before the end of the eighteenth century, in the erection of the Brandenburg Gate at Berlin, with its great Doric columns (which may have given the suggestion for the Doric portico at Euston). With the new century the Germans went into Classic revival with enthusiasm, and on a great scale, and their architects certainly did the thing exceedingly well. Klenze's (1784–1864) columned Ruhmes-halle at Munich (577), with its two projecting wings, forming the architectural background to a colossal statue, is a grand conception of its kind; his Glyptothek at Munich, with its columned central portico and plain contrasting wings, is a good composition, and an appropriate façade for a sculpture gallery. The other, and perhaps more important, representative of Greek classicism in Germany in the early part of the century was Schinkel (1781–1841), who was an architect of some genius in a rather academical way, and built among other things two fine columnar Classic buildings at Berlin—the Museum (576), a quadrangular building with an open colonnade in front, and the Royal Theatre; and his pupil Strack subsequently carried out, in a similar style, the National Gallery at Berlin, also a fine building of its type. Schinkel could perceive, however, that revived Greek was not everything in modern architecture, and endeavoured to treat the Bau-Akademie at Berlin in a modern style, with coloured brickwork

and flat buttresses ; but he was hardly at his best away from the Classic orders, which he understood thoroughly how to use. His Nikolai church at Potsdam, however (578), is a striking and original building, with a columned dome mounted on an immense square block of wall with turrets at the angles, which rather reminds one of the masses of walling in Soufflot's Panthéon, and was possibly suggested by it, though the building is by no means equal to the Panthéon. Semper (1803–79) was a classical architect of somewhat the same school as Schinkel, and is credited with the designs of the Hofburg Theatre, and the crescent-shaped wing of the Hofburg Palace at Vienna, though they were not carried out by him, but by Hasenauer after his death. The development of a deadly dull classicism perhaps explains the revulsion of feeling that followed it, finding expression in the extreme freedom, almost license in fact, of the modern German school. An instance of this prelude is illustrated in Fig. 581—the Houses of Parliament, Berlin.

Vienna also contributed largely to revived Classic architecture ; the Parliament House, by Hansen (1830–90), about the middle of the century, is to exterior appearance a group of temples of the Corinthian order (575). At Vienna, however, though there was nothing like a Gothic revival either there or elsewhere in Germany, some large Gothic churches were built, especially the Votive church by Ferstel (1828–83), which may be described as a starved reproduction of Cologne Cathedral. Vienna has also a Gothic Town Hall, by Schmidt (1825–91), which is better than the Votive church.

Belgium has produced, in the Law Courts at Brussels, by Poelaert (1816–79), a building which in the Classic revival period stands almost alone as an attempt to use Classic materials in a free and original spirit both of composition and detail (585). It is not altogether satisfactory ; there is a want of unity of design as a whole, and a want of scholarly character in a class of detail in which we seem to require that character ; but it is a building which gives evidence of architectural genius.

The Greek Revival, product of the affluence generated during the Industrial Revolution, soon became established in what was perhaps the most highly industrialised country in the world, America. Although at the outset of the nineteenth century American architecture was still almost entirely of timber—even monumental buildings were constructed of this humble material—the vernacular " Georgian " version of English Renaissance had become thoroughly implanted in the minds of American architects, whose timber buildings, clothed in their white-painted boarding, were worthy to rank with their more substantial brethren in the mother country. The rapid development of the colony after its secession, and the wealth which its hitherto untapped resources enabled the population to acquire, encouraged the growth of a vigorous building trade and the establishment of a technique employing more permanent materials. Thus it was not difficult for the American architects to turn from their graceful timber " Colonial " style to the sturdy monumental architecture of the Greek Revival ; the transition is exemplified in the work of Charles Bullfinch, from delicate Adam Classic towards the robuster full-fledged Greek. Indeed, the country became devoted to the style, producing buildings which

are perhaps the finest examples to be seen anywhere in the world. The second quarter of the century was its zenith. One of its best exponents was William Strickland (570); Robert Mills and Stephen Upjohn are amongst the many skilful architects who helped to create the Greek Revival style of America.

Two principal types of monumental building may be noted. City churches, similar in design to contemporary buildings in London, grace, with their steeples, most of the older towns of the eastern states. The most important monumental buildings of the era were, however, the administrative centres of the individual states; these structures, known as "capitols," were usually crowned by large domes the designs of which appear to have been founded upon English models (570). Thus did the Renaissance architecture of the mother country achieve ultimate perfection in her emancipated colony. The country mansion, translated from the Colonial to the Greek Revival, became a building of great dignity, comparable with few English houses of contemporary date.

The regrettable feature of the Greek Revival of the mid-nineteenth century was that it inaugurated a period during which architecture degenerated into a series of experiments with various historical styles. We have seen how the Romantic reaction from the materialism of the industrial age produced in England the noble aberration of the Gothic Revival. No other country, however, regressed so drastically as to base its architectural style upon that of the Middle Ages; nor did America imitate the mother country except occasionally in ecclesiastical and collegiate architecture. Yet the Greek Revival had undoubtedly halted architectural development; relapse into the sphere of archæology had deprived architects of a basis for research into the modernising of their craft, setting them experimenting, instead, with archaic styles in their feverish attempts to find some way of clothing the great buildings of the day. What was greatly complicating the issue was the revolution in building methods which accompanied the Industrial Revolution, creating structures entirely unsuited to such treatment. Yet through the mazy pages of architectural history books the search went grimly on, producing the era of Eclecticism which covered even industrial buildings with Classical, Mediæval, Byzantine, Renaissance, and even Egyptian detail, involving their designers in a morass from which even to-day they have barely succeeded in freeing themselves.

That the situation was desperate can be appreciated when it is realised that a new material had suddenly appeared to upset all established building methods. The expansion of heavy industry and the resultant substitution of steel for cast iron in beams had enabled these to span a wider opening and carry a far greater load than had hitherto been found possible. Development of the design and methods of assembling steel members progressed until by the last quarter of the century it was becoming possible to build a structure consisting of a complete frame of steelwork which would support roof and floors independently of the walls, thus making it possible to design the surfaces of these without regard for structural requirements. The first reaction to this emancipation was for architects to break out into even more violent orgies of Eclecticism. Less erudite

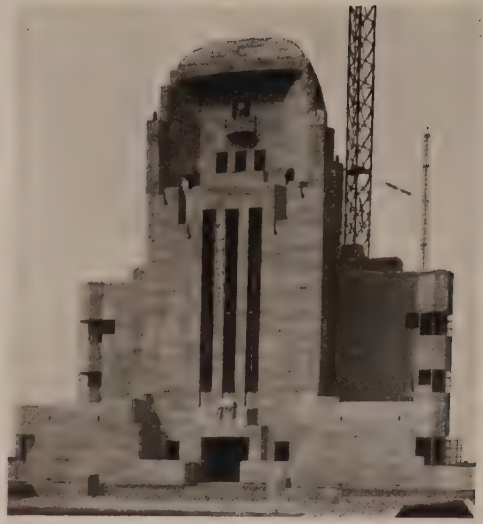
designers, however, were content to limit the architectural sheath of their structures to the simplest forms by merely following the lines of the steel framing. In doing this, they were, in fact, laying the foundations of what was to be the first really modern style of architecture.

By the last decade of the century, leadership in monumental architectural design had moved to America. The peculiar difficulties associated with the site upon which its principal city had been founded was forcing its architects to consider some means by which far more accommodation could be provided upon each building lot than had hitherto been found necessary. The obvious solution was to build structures rising to many stories, a feat now possible owing to the development of the steel frame. By the beginning of the present century, English architects had settled down to clothing the skeletons of their commercial buildings with façades designed on what might be termed a compromise between Classical and Renaissance treatments. In America, however, the rush to exaggerated verticality seems to have urged architects to even more startling essays in Eclecticism ; many of these considerable feats when one considers that such archaic styles as Gothic or Byzantine were fearlessly applied, often with some measure of success, to such ultra-modern masses as those of the skycrapers of New York or Chicago. Yet behind the brilliant façades of these great buildings one factor is ever dominant ; the very lines of the building were forcing designers towards acceptance of the principle of the " stripped " technique in which the outer skin must repeat the skeleton upon which it has been set.

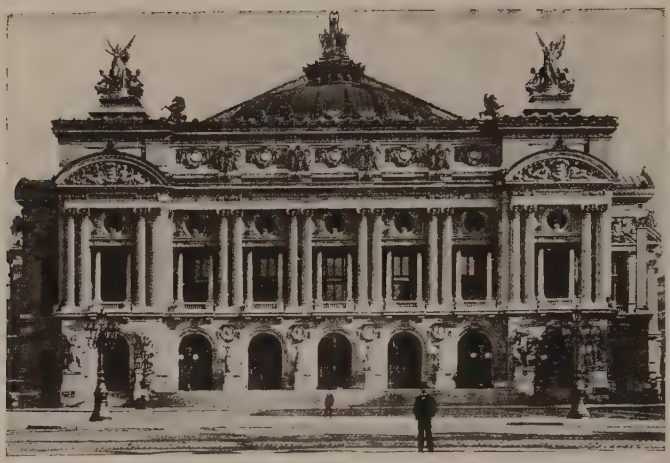
The Old World was lagging behind the New. The skyscraper, unacceptable in the ancient cities of Europe, was ignored by their traditionally-inspired architects. Thus the less forceful scale of European buildings created no problems which could not be dealt with along traditional lines. Eclecticism, albeit secretly deplored, had yet to be superseded. The " stripped " style, convenient enough in the case of purely industrial buildings, lacked effect when applied to a structure deprived of the magnitude of an American building. Indeed the first result of the new trend in modernity was to produce a vigorous European reaction in favour of even more elaboration in architectural design and detail. The French, in particular, seem to have been determined to have nothing to do with the new austerity. Leaders during the last great period of traditional architecture and enthusiastic disciples of Eclecticism during the various revivals, they were able, however, to agree to abandon the use of obsolete styles. During the early years of the present century they made efforts to develop a new style of architecture based upon the principles of design as discussed amongst students of art. They treated with contempt the subversive influences of the mechanical lines of steel framing. The " Art Nouveau " which these reactionary French architects devised sealed the fate of the principles upon which they were founded. Even the devotion of the determined but uninspired designers failed to support them against the relentless pressure of the revolutionary constructional methods and materials. Lacking any practical foundation, the " Art Nouveau " proved ephemeral ; its products to-day are objects of curiosity rather than admiration (587).

588 Shop Building, Berlin (*c.* 1925)
Erich Mendelsohn, architect

587 An *art nouveau* Interior at Brussels (1893) (*left*)
Victor Horta, architect



589 Radio Station, Kootwyk, Holland (*c.* 1925)
J. M. Luthmann, architect



590 Opera House, Paris (1861–74)

591 St Augustin, Paris (1860 68) (*above*)

592 Church of La Trinité, Paris (1861–67) (*above left*)

593 Musée Galliera, Paris (*c.* 1890) (*left*)

While France and Belgium were involved in the toils of this pathetic experiment, England had stolidly settled down to a dull sub-Classical style. Germany, however, lacking cultural affinities with either country, was turning to the New World for further inspiration. Holland, also free from entanglements with traditional monumental architecture or artistic principles, was looking with interest across the Atlantic. Neither was engaged in building experiments on a scale comparable with the American skyscrapers; both, however, were beginning to modernise their industrial and public buildings. The "stripped" technique found favour in the eyes of Dutch and German architects, who were thus the first Europeans to throw off the shackles of traditional architecture and its resultant Eclecticism (588, 589).

These encouraging experiments notwithstanding, the early part of the century was an unhappy one for architecture. The only part of the world where some sort of order seemed to be appearing had the misfortune to be involved in the Great War of 1914–18, which checked development at a stage just when the future held most promise. Yet the disaster produced two factors which in the long run assisted recovery. One of these was the housing shortage which, due to wartime cessation of building, affected all the European countries engaged in the struggle. Resumption of housing programmes was sorely hindered by the loss of stocks of building timber and the difficulty of procuring enough to meet the demand. The absence of this important traditional building material actually served to encourage the efforts of those architects who happened to be experimenting with new methods of construction. The substance to which they turned was concrete.

Concrete had been known in the days of the Romans, who had employed it, in the mass, for many of their great monumental buildings. The development of steel construction, and improved knowledge of structural mechanics, enabled experiments to be made with the reinforcement of concrete with steel bars so as to increase its tensile strength and enable it to be used for beams. A crude form of concrete floor had actually appeared during the Victorian period, but the improved material enabled whole buildings to be erected in reinforced concrete. The first experiments were made with the floors and roofs of small buildings, chiefly those houses deprived by circumstance of their traditional timber joists and boards. Germany and Holland were in the forefront with the new style, producing simple designs, flat-roofed and often with projecting balconies advertising the properties of the new material. The exposure of the floor as an architectural feature instead of a mere structural requirement began to introduce a definitely horizontal note into designs, especially on the Continent, as yet uninterested in the exaggerated verticality of contemporary American buildings. Emphasis on the horizontal element in façades spread to details, especially openings, the spans of which could now be greatly increased. Groups of windows of traditional form, each covered with an arch or a wooden or stone lintel, were collected together under a single long beam of steel or reinforced concrete, thus forming a "landscape" window embracing a wider and uninterrupted view. The traditional bay

window was replaced by glazing the whole angle of the building, modern materials making it an easy matter to support the walling above as necessary (588).

After the first wave of these " stratified " façades, the Continental architects began to appreciate that strong vertical features were desirable, not only to stabilise the composition, but also in order to restore to it the monumental element. Thus, by a well-considered combination of structural and æsthetic forms, the architects of north-west Europe were able to create a definite monumental style of architecture, at the same time impressive, entirely modern, and free from the long subservience to traditional styles.

French architects appear to have been temperamentally incapable of accepting the austere designs of their neighbours without some attempts of their own to explore the potentialities of reinforced concrete. They were clearly intrigued at the discovery that it could quite easily be coerced into assuming the curved forms to which at all times they have been devotedly attached. Finding that a concrete frame designed so as to perform efficiently the task assigned to it appeared to the ordinary observer exactly as if this were so, they took to exposing, wherever possible, the reinforced concrete forms upon which their buildings were founded. This " Functionalistic " architecture, though suitable for industrial buildings and such specialised structures as those connected with sport, was too startlingly novel for use in connection with monumental buildings. Professor Gropius in Germany (598) and Le Corbusier (599) in France were the prophets of the new style. But a new and vigorous thrust had been made away from traditional forms and styles ; the very introduction of Functionalistic architecture had made it clear that Eclecticism or any other variety of traditionalism had been definitely abandoned and the search for modernity accepted as the basis for architectural progress. Styles and Orders became things of the past, except in so far as these were required for the detailed ornamentation of certain portions of buildings, especially in the embellishment of their interiors.

Most of the interest associated with the great styles of the past has been focused upon architectural detail. All this is now changed. Since the later twenties of this century it has been forms, and not details, which have governed the attention of the building designer. Traditional architecture had been principally concerned with the assembling together of a series of two-dimensional façades ; nowadays it is well realised that all three dimensions of a building must be given their correct proportions. In very large buildings, each part must conform to this axiom. The simplest and most obvious architectural form being the cube, it is this which is appearing as the basis of design. The great skyscrapers of America appear to-day as piled-up cubical masses (600, 601). Even in less progressive England large buildings such as Shell-Mex House (596) or the new London University (597) demonstrate that architecture is now built up of form and mass, with detail relegated to an inconsiderable position in the design.

Perhaps the most strongly marked style of the century will be found in the housing schemes for the working-classes, in which a new blood relationship is

594 Welwyn Garden City, Hertfordshire (1920)
Louis de Soissons, architect

595 Wythenshawe Housing Estate, Manchester (1930)

596 Shell-Mex Building, London (1932)

Messrs. Josephs, architects

597 London University (1936–39)

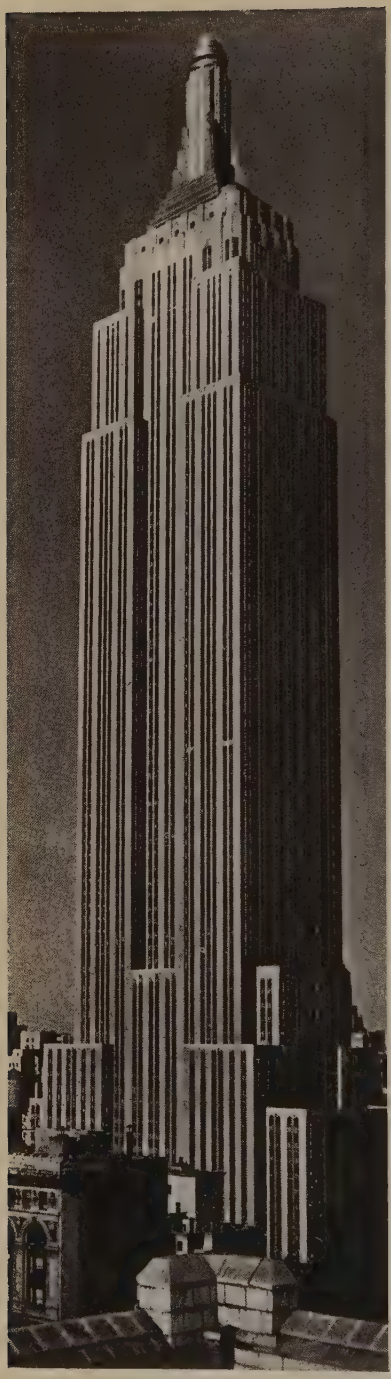
Sir Charles Holden, architect

598 School at Impington, Cambridgeshire, 1938 (*above*)

Walter Gropius, architect

599 Swiss Pavilion, Cité Universitaire, Paris (1932) (*left*)

Le Corbusier, architect



600 Empire State Building, New York

Shreve, Lamb & Harmon, architects (1931)

601 Rockefeller Center, New York; Time and Life, R.C.A., and International Buildings

Architects:

Reinhard and Hofmeister, Corbett, Harrison and MacMurray, Hood and Fouilhoux, (1930–50)

to be traced throughout the country. Force of circumstances and unity of social purpose, together a fortunate activity in the right class of designer, have combined to produce one of the most coherent architectural phenomena of the age. Welwyn Garden City (594) after the First World War, and Wythenshawe House Estate, Manchester (595), after the Second, may be taken as typical of the movement. There may be seen the simple roof, orderly arrangement of doors and windows with unconfused detail, and a dependence upon the texture of good material honestly handled. Within limits the plans are an arrangement of more or less identical units within each house, and the mass treatment of these house units in the scheme depends upon an orderly, but not monotonous, layout on axial lines in which groups of identical units are centred upon a varied type in charming balance. The modern housing effort leaves a splendid heritage to the future, in striking contrast to the vicious extravagances of the speculative builder of a past generation.

We have reached the heart of the twentieth century. On both sides of the Atlantic, mountainous masses of steel and masonry are reaching to the sky, upon a scale never dreamt of by those ancient architects who, with antiquated tools and materials, have striven through the centuries to raise the buildings which have formed the subject of this History. Architecture once more embarks upon yet another great experiment.

GLOSSARY

ABACUS—Literally a tile or a flat square block of any material; a Latin word (traced by some authorities to a rather doubtful Greek word Αβαξ). In Classic architecture, the flat block which forms the upper member of a capital, and on which the architrave rests. In the Doric capital it is a plain rather thick square slab; in the Ionic a small thin member interposed between the volutes and the architrave, not a noticeable part of the design; in the Corinthian it again assumes importance, as a square with slightly concave sides and moulded on the edge. The plain square abacus survives in early Gothic capitals, especially in France, where it continues later than in English work. The word is not properly applied to the upper member of a circular capital.

ATTIC—A name rather absurdly given, at the Renaissance period, to a small architectural story introduced above the main cornice of a building, apparently suggested by the treatment of the upper portion of the Roman triumphal arches (*see* illustration, page 95). In spite of the name, it has no precedent in anything in Greek architecture.

ATTIC BASE—A form of base to a Classic column, called "attic" by Vitruvius, consisting of two convex members with a concave one between them, separated by fillets. It is the most effective base there is to a Classic column, and the most largely used to this day; and in this case the word "attic" is correct, as it really was used by the Greeks, as in the Erechtheion, though Vitruvius could hardly have been aware of the fact.

BALUSTER—A miniature column with a capital and base, but with the shaft generally designed with a swell in it, either at the base or in the centre, instead of the straight shaft of the column proper. Most frequently used round the roofs of buildings; hence "balustrade." It is a Renaissance invention, and has no precedent in the Classic architecture of antiquity. There is a form of baluster peculiar to Saxon architecture (*see* page 171).

BAROQUE—Properly signifying a heavy and clumsy treatment of Renaissance architecture, with coarse and florid detail; improperly used to denote a supposed "style" which has no existence as the style of any special period.

BARREL-VAULT—A stone or brick roof built in one continuous arch, semicircular or pointed, along the longer axis of a building.

BASE (of a pier or column)—A moulded or unmoulded projection below the shaft of a column, generally in one block, on which the shaft rests. The structural object is to distribute the weight of the column over a larger area of ground surface.

BASILICA—A Roman building for business purposes, generally open on one of its longer sides to a forum. The interior had a range of columns all round, carrying galleries, with columns in the upper story supporting a raised roof to the centre portion (*see* page 129).

BASILICA CHURCH—The name given to the typical form of early Christian church, with three (or sometimes five) aisles and an apse at one end, which had some structural resemblance to the Pagan basilica, and was probably partly suggested by it, especially in regard to the raised centre and lower side-aisles. In books on architecture, Basilica churches are often called simply "Basilicas."

BATTER, BATTERING—A wall of which the outer face slopes somewhat inwards as it ascends, is said to "batter."

BAY—In Gothic architecture, the longitudinal space occupied by one arch and the adjoining piers of the arcade, and one main compartment of the vaulting, forming the element of the architectural design, which is repeated in each bay. It may be used of any arcaded building with a repeating design, but is not applied to colonnaded architecture, probably because the portion above the colonnade is continuous and not divisable into sections.

BEAM—A horizontal member bridging over a space, whether carrying superincumbent weight or not; generally used only of wood or iron.

BEARING (of a beam or lintel)—The distance between the limits of the points of support, *i.e.*, the total unsupported length. Also used (by rather a confusion of nomenclature) of the portion of it which rests upon the supports; "with 9 in. bearing on the walls at each end" means that it goes 9 in. into or onto the wall or pier. It would be better to call this (say) the "seating," so as to avoid using one word in two senses.

BED-MOULD—*See under* CORNICE.

BEMA—In a Basilica church plan, an open space between the termination of the arcade and the eastern wall and apse. Many Basilica church plans, however, are without it, the colonnade or arcade running up to the east wall. The bema may be considered as the first hint of what was afterwards to develop into the "transept."

BLOCKING—A plain mass of wall, not very high, above a cornice in Classic architecture; originally used to block out the sight of a sloping roof from below; hence the name.

BOSS—In Gothic architecture, a small projecting block of stone, commonly carved into a foliage design, placed either to mask the junction of vaulting-ribs, or as the lower termination of a hood-mould, or to finish off an interrupted string-course.

BRACKET-CAPITAL—A capital with a bracket projecting from it at each side, so as to practically shorten the bearing of the architrave or lintel from one column to another. It is a special feature of Hindu architecture, and is also found in Saracenic work and in early Spanish Renaissance (in the latter case probably derived from Moorish example).

BROACH—In Gothic, a sloping triangular piece of masonry built up from the angle of a tower against the adjacent face of an octagonal spire, serving to fill up the angle and connect the lines of tower and spire. It occurs most often in thirteenth-century work.

BUTTRESS—Generally, any considerable projection from the face of a wall, to resist outward pressure. In Gothic architecture it became an important element in the design.

CALIDARIUM—The hot-bath chamber in the Roman thermæ.

CAMPANILE (from *campana*, a bell)—The name given to the mediæval and Renaissance form of Italian tower; generally, though not exclusively, of towers attached to or grouped with churches. The essential character of the Campanile is that it is built on entirely vertical lines (not diminishing upwards), and with openings generally increasing in number in the upper stages, or sometimes confined entirely to the highest stage. A campanile may or may not have a spire or lantern termination. Of course the name might be logically applied to any tower built to carry bells; but the word has become accepted as implying a special type of tower.

CANCELLI—Railings dividing off the semicircular court in the Pagan basilica; afterwards adopted in a somewhat similar position in the Basilica form of church; hence "chancel."

CAP—Sometimes applied, rather irregularly, to the capitals of the slender shafts occurring in Gothic architecture, as implying a feature smaller and less important than a "capital."

CAPITAL—The crowning member of a column or pier, on which the superstructure rests. It has generally received a decorative treatment, often of a very fine and elaborate character, especially in Roman, Byzantine, and Gothic architecture.

CARYATIDE—A sculptured female figure used as an architectural support, in place of a column. The finest examples are those at the Erechtheion at Athens; scarcely inferior to them are those by Jean Goujon at the Louvre.

CAVETTO—In Renaissance terminology this means a concave quarter-circle moulding; but in Egyptian and Greek work this class of moulding assumes a more refined form of curve, generally founded on conic sections.

CELLA (Greek *Naós*)—The central portion of a Greek or Roman temple, enclosed within solid walls.

CENTERING—A temporary construction erected on which to build an arch, and hold it in position till the keystone has been inserted and the arch has thoroughly consolidated. Till modern times centering was always of timber, and in some localities the scarcity of timber for centering very much influenced the methods of arch construction. In the present day iron centering is often used in important engineering works, such as stone or granite bridges of wide span.

CHEVET—In French cathedral plans, the design of the east end with a series of chapels opening out of the apse, and in general radiating from its centre. The device is occasionally found in England, as at Westminster and Tewkesbury, but is not common in this country.

CLEARSTORY—In Gothic architecture, the upper portion of the nave walls in a cathedral or three-aisled church, which is above the aisle roofs and pierced with windows; hence "clear" story, in contrast to the dark arches of the triforium arcade below it. Sometimes absurdly printed "clerestory"; a mere affectation in a modern book.

COLONNETTE—A miniature column, sometimes used in monuments or in the parapets of buildings; more often applied to Classic than Gothic architecture. A baluster is not a colonnette, but has a form of its own; a colonnette has the usual form and proportions of a column.

COLUMN—An upright member of any material, of any simple form of plan—circular, polygonal, or square (most usually circular), to carry superincumbent weight (*compare* PIER).

CONCRETE—A mixture of small broken rubble, called the *aggregate*, with a cementing material called the *matrix*, formed (in modern work

of Portland cement and sand in certain specified proportions, according to the degree of strength desired. It is mixed with the aggregate in a wet condition, and the whole hardens into a solid mass. Concrete, with a very strong cementing material, the precise composition of which is not known, played a very large part in Roman structures. The use of concrete has been largely revived in recent times, especially for foundations, and also, in a modified form, for floors and for entire buildings (*see* Reinforced Concrete).

Corbel—A stone tailed into a wall and projecting from it in order to carry something which rests on it. Corbels were largely used in Gothic architecture, and were generally carved in a decorative manner.

Corbel Table—In Gothic architecture, a series of regularly spaced corbels supporting an oversailing feature or moulding; often placed at the base of a spire or of the parapet of a tower, or under the eaves of a roof.

Corbelling-Out—A method of obtaining support for a projection in the upper part of a building, by building out each course of masonry or brickwork a little beyond the one below it, till the required projection is reached. A familiar example is the form of circular angle-turret seen in so many mediæval Scottish castles, generally corbelled out from the angle.

Cornice—The upper portion of the entablature in a Classical building, divided into three main portions: the *bed-mould*; a considerable projection above it, called the *corona*; and the *cymatium* or crown moulding, springing from the upper edge of the face of the corona. In Roman architecture, though this threefold division of the cornice is always maintained, they are often much elaborated and multiplied in detail. Though the term originated with Classic architecture, it is often applied to the mouldings which form the crowning finish to a wall in any style of architecture. The Classical cornice may be considered to represent the decorative treatment of the projection of the roof beyond the wall line.

Crocket—In Gothic architecture, a decorative projection, generally of conventional carved foliage, on the outer moulding of a gablet, or (often) on the angle moulding of a spire. The foliage crockets of the Decorated period are remarkable examples of the æsthetic perception of the mediæval carvers in the conventionalising of foliage forms into an architectural consistency.

Crossing—In a mediæval church, the central space at the intersection of the nave and transept. The four piers at its angles are called the "crossing-piers," and the main arches which spring from them the "crossing-arches"; and the expression "the crossing" is sometimes used with reference to the whole architectural treatment at this point.

Crown Moulding—*See under* Cornice.

Cupola—A small dome-covered erection rising above the general line of a building. The word is sometimes applied to the larger erection generally spoken of as a dome, but it is more convenient to use it as an expression distinguishing a small subsidiary dome from a large one; a distinction which is, in fact, practically made, for though you may call a dome a cupola, you cannot call a cupola a dome; the word is too large for it.

Cusping—Small subsidiary arches springing from the inner side of the main arches in Gothic tracery, giving to a Gothic window a good deal of its characteristic appearance. It has been suggested that the cusp originated in the idea of weighting the inner side of a curved tracery bar to counteract any tendency for it to open at the joint; this is possible, but cannot be considered as proved.

Cyclopean—A term applied to ancient walls (generally Pelasgic or supposed to be so) built of very large blocks of stone of irregular shape.

Cyma—In the vocabulary of the Renaissance architects, a moulding composed of a reversed curve—a convex line and a concave line combined. Where the concave part is uppermost it is a *cyma recta*; where the convex is uppermost it is a *cyma reversa*. The cyma recta was the favourite crown moulding for a cornice both with the Roman and the Renaissance architects, and its light effect suits the position. The cyma reversa has a heavier effect, and is often used in the bed-mould.

Cymatium—*See under* Cornice.

Dentils—A series of small square blocks or projections in the bedmoulds of Ionic, Corinthian, and Composite cornices; occasionally introduced in the Roman Doric Order, but not in the Greek Doric. The rule of Vitruvius is that their distance apart should be two-thirds of their width, but the Renaissance architects generally placed them closer. Whatever their origin (about which there are various theories), there is no doubt that they have an admirable effect in giving a sparkle of light and shadow to a cornice.

Diagonal Rib—In Gothic vaulting, the ribs which cross diagonally from corner to corner of one bay of the vaulting. They are the oldest of the vaulting-ribs, the parents, as one may say, of all the others; following the line of the diagonal edges or groins first formed by the intersection of two arched vaults at right angles.

Diaper Ornament—A small carved, painted, or inlaid ornament repeated over a considerable

extent of surface, deriving its effect from the repetition.

Dome—A built roof circular on plan and either semicircular or in some other arch shape in section. The essential structural character of a dome lies in the fact that its masonry is in arch form horizontally as well as vertically; an octagonal dome, like that of Florence cathedral, is not a true dome in a structural sense, and its statical conditions are not the same as those of a circular dome. Domed roofs have been constructed in timber and in iron, but in these cases the dome form has only been adopted for the sake of appearance, and possesses no structural advantage.

Dosseret—A square block, larger at the top than at the bottom, placed on the main capital in Byzantine architecture. It probably arose from the endeavour to level up the unequal heights of columns and capitals brought from older buildings.

Dromos (*Δρόμος*)—Originally a race-course; hence, architecturally, a walk or passage between long walls.

Drop-Tracery—A tracery design as if dropped or hung from the intrados of an arch, like a kind of inner ornamental border to it; found occasionally in late Gothic.

Drum (of a dome)—The circular wall on which a dome is raised.

Drums (of a column)—The circular stones of which a built column is formed.

Echinus—The circular member beneath the abacus of a Doric column.

Elevation—A method of drawing a building, or part of a building, or a piece of furniture, &c., as if there were no distortion by perspective, and as if every part were opposite to the eye at the same time. In an elevation drawing the side or flank of the object is ignored altogether; it must be shown on another elevation at right angles to the front one. The use of an elevation drawing is that its size, and the size of parts of it (as doors, windows, &c.) can be exactly represented to a definite scale, and measurements can be taken from it. An elevation drawing shows one face of an object only, but shows it as it actually is; a perspective drawing shows two or more faces, but as they appear to the eye, not as they exist.

Enceinte Wall—The outer enclosing wall of a temple or forecourt, or of a collection of temples or other buildings grouped together.

Entablature—In Classic architecture, the whole superstructure resting on the columns, consisting of architrave, frieze, and cornice.

Entasis—A slight outward curvature or swelling of what would otherwise be the straight lines of a Classic column. With the Greek architects of the best period it was an almost invisible curve, used apparently only to correct the tendency of straight lines in certain situations to look hollow. In one or two archaic Greek temples, and in some Roman, Renaissance, and modern buildings, the entasis has been greatly exaggerated, so as to become almost a deformity. What may be called the invisible entasis, as a correction of optical effect, has been used with advantage in some modern spires, and should be used in all, as well as in lofty pedestals, steles, obelisks, and such erections. Whether the mediæval builders ever used it in this manner in their spires is doubtful; but they have left some spires with a strongly marked visible entasis.

Extrados—The outer line or back of an arch, formed by the upper edges of the voussoirs.

Façade—The principal front, generally the entrance front, of a building. It is only used of large and important buildings.

Fan-Vault—In English Gothic, the latest form of vaulting, in which all the ribs radiate, fanlike, from the same point and at equal angular distance from each other. In this form of vault the ribs are only decorative, not structural, each "fan" being really an inverted concoid built solid, and the ribs worked on it as a surface decoration.

Ferro-Concrete—*See under* Reinforced Concrete.

Fillet—In a series of parallel mouldings, a narrow strip of surface dividing, where necessary, one moulding from another, or used to define or accentuate the limit of a moulding.

Flêche—A small and light spire planted on a Gothic roof, either on the ridge, or in cathedrals generally at the intersection of the nave and transept roofs, especially in French cathedrals. It was generally constructed of wood, sometimes covered with lead treated in a decorative manner. Modern flêches are often made of wrought iron. The essential character of a flêche is that it is not a monumental erection of solid materials, but such a construction as can safely be placed on a timber roof.

Flute, Fluting—The vertical channelling on the shaft of a Classic column or pilaster. It has been used occasionally in other positions, as on the surface of a pedestal, or as a simple ornament to a frieze. Sometimes we find the torus member in the base of a Classic column longitudinally fluted, as in the Anta at the Erechtheion (*see* page 65). But the principal use of fluting is to give expression to the vertical shaft of the column by emphasising, so to speak, its verticality.

Flying Buttress—An arched buttress used in Gothic building to discharge the thrust of

the nave vault, across the aisle roof, to the main buttress standing outside the aisle. It is much more largely and boldly used in France than in England, the great height of the French nave vaults demanding this support; but the result is sometimes too like a stone scaffolding.

FRIEZE—In the Ionic and Corinthian Orders, the space left between the architrave and the cornice. It was generally decorated with sculpture in relief, either of figures or ornament; hence the term "frieze" is sometimes applied to any horizontal band of sculpture in relief.

FRIGIDARIUM—The cold-bath chamber in the Roman thermæ.

GABLE—The triangular space of wall, generally with a coping of some kind on its sloping sides, which forms the enclosure at the end of a high-pitched roof. It is to Gothic architecture what the pediment is to Classic architecture.

GABLET—A miniature gable, often used as a decorative form in Gothic buttresses or in woodwork.

GEOMETRIC TRACERY—*See* TRACERY.

GROIN—The edge left by the junction of two surfaces of a vault.

GROIN-RIB—A moulded rib defining and strengthening the line of a groin, and which ultimately became the stone skeleton of the vault.

HAMMERBEAM ROOF—In late Gothic, a timber roof built up on the principle of a series of framed brackets, each carried by and projecting beyond the one below it; the lowest one resting on the wall.

HAUNCHES (of an arch)—The middle portion of the convex curve on the back of an arch.

HOOD-MOULD—A projecting moulding in Gothic architecture, above the arch of a window or door, or (in English Gothic) above an internal arch.

HYPOCAUST—The heating chamber in the basement of a Roman bath.

HYPOSTYLE HALL—In Egyptian architecture, a hall with a roof supported on a number of columns, of which the two centre rows are higher than the rest, and which is lighted by windows above the lower columns. The sense of the expression, compounded of *ὑπό* and *στῦλος*, does not seem very obvious (as *ὑπό* means rather "under" than "over"); it may refer to the fact that the side columns are under (lower than) the centre ones; but it has come to mean this particular form of columned hall.

IMPOST—Any point from which an arch springs, whether defined by a capital or not.

INTERCOLUMNIATION—The space between the columns in a colonnade, considered proportionately to the width of the columns themselves. It is sometimes stated as from centre to centre of the columns.

INTERMEDIATE RIBS—In Gothic vaulting, ribs that are not structurally necessary, but are introduced for appearance sake, between the main structural ribs. They are more largely employed in English than in Continental vaulting.

INTRADOS—The inner line of an arch, formed by the lower edges of the voussoirs.

JAMB—The sides of a door or window opening, formed by the thickness of the wall in which they are pierced.

JOIST—Horizontal wooden bearers, much deeper than their thickness, placed in parallel lines from wall to wall to form a floor, and on to which the flooring boards are nailed; 9 or 10 in. by 2½ in. is an average size. Joists are not "beams"; where a floor is wide enough to require beams, these support the joists, which cross them at right angles. "Ceiling joists" are similar parallel bearers of smaller section, having no floor to carry. Iron joists and beams are arranged in the same manner.

KEYSTONE—The central voussoir in the crown of an arch, the last to be placed in position, which completes the arch. Pointed arches in mediæval building had no keystones; or rather, perhaps, one might say they had two keystones, with a vertical joint between them at the apex of the arch.

KING-POST—In a trussed roof, the vertical post which is gripped between the heads of the principal rafters, and holds up the centre of the tie-beam by means of iron stirrups or bolts. In a steel truss it would be the "king-bolt." Sometimes a wrought-iron king-bolt is used in the construction of wooden roofs, instead of a king-post, as only tension has to be provided for.

LABEL—The same as HOOD-MOULD.

LACONICUM—An apartment in the Roman thermæ, the use of which is not very clear. Vitruvius merely says that it is to adjoin the Tepidarium.

LANCET WINDOWS—A name sometimes given to the narrow pointed windows of the Early English style of architecture, from their resemblance to the blade of a lancet.

LANTERN—A word used architecturally for a small structure making a finish to a dome or a tower, generally merely for reasons of effect, as it seldom or never lights anything. The small structure on the top of the dome of St Paul's, for instance, is called the lantern and there is no other name for it. A lantern

is not a cupola, nor a spire, nor a dome; it is just a lantern.

LIERNE RIB—Small decorative ribs in the design of a Gothic vault, not structural, and introduced only for effect. They are used chiefly in the "Decorated" period of English vaulting; in French Gothic they are only found in very late work.

LINTEL—A beam, of any substance, placed across the opening of a door or window to carry the wall above. It differs from a beam proper in that it must bridge over an opening in the wall. A beam may be anywhere, and carry anything or nothing, and it is still a beam; but the lintel has a special function.

LOGGIA—An open colonnaded or arcaded gallery, generally on the ground floor of a building, and frequently introduced in the Renaissance Italian palaces as a covered walk surrounding the interior courtyard. A loggia is also sometimes introduced in the upper story of a building, under the roof, where it often produces a charming architectural effect, besides being convenient for prospect.

LUCARNE—Small projections from the face of a spire in Gothic architecture; tall and narrow, with window slits in them, and capped by gablets, often with decorative finials. They serve to break the line of the spire.

MACHICOLATION—In mediæval castles, a series of large boldly projecting stone corbels, carrying a stone flooring and parapet over them, but with slits between the flooring and the main wall for pouring down boiling lead or other charitable compounds on the assailants. So far they were merely military engineering; their architectural interest arises from the fact that in the early French Renaissance château they were retained as a piece of architectural effect and from old association, and have often been imitated in quite modern buildings for the same reason. The English word is derived from French *machicoulis*; but what that is derived from no one knows.

MASTABA—A form of ancient Egyptian-built tomb; a rectangle with slightly sloping sides and sometimes with a rude columned portico in front. They may probably be dated from anywhere between 4000 and 3000 B.C.

METOPE—The square spaces between the triglyphs in a Greek Doric temple, filled with thin stone slabs, not structural, and usually sculptured in relief.

MIHRAB—The prayer-niche on the Mecca side of a mosque. It was often very richly decorated; a remarkable example is that in the mosque at Cordova (*see* page 183).

MITRE—The junction of two mouldings of the same section at an angle. In woodwork the moulding is worked on each piece up to the line of junction, which is therefore an oblique section of the moulding; *i.e.*, if the two moulded pieces join at right angles, each moulding is cut through at an angle of 45°, and the two surfaces butted against each other. In stonework the mitre and the adjacent portion of the return moulding are worked out of one piece of stone.

MODILLION—A form of bracket introduced beneath the corona of the cornice in the Corinthian and Composite Orders of the Romans. They are regularly spaced, at distances always greater than their own width, and generally take a scroll form and are decorated on the under side with a carved acanthus leaf. They add greatly to the rich effect of the highly decorated Roman cornices. In the Corinthian temple of Jupiter Olympius at Athens, erected probably by Greek artists under Roman rule, the modillions are quite plain and smaller than is usual in Roman work—no doubt the influence of local Greek taste.

MONOLITH—In one stone; used frequently of the shafts of columns, to distinguish them from those built up in separate drums.

MOSAIC—A form of pictorial or other decoration produced by building up a design out of a number of small pieces of coloured glass or marble, set in cement against the wall surface or on a floor, or on the concave surfaces of a dome or vault. It has been occasionally used, by the Romans, to give colour decoration to columns, but it is better suited to flat or concave surfaces. It is the most durable and one of the richest and most effective forms of colour decoration there is. The name is said to be derived from the Greek Μοῦσα, a Muse, though the connection is not very obvious.

MOULDING—A modelling of the surface of any material, such as stone, wood, or plaster, &c., in a profile carried along continuously, so as to produce lines of light and shadow. The delicacy of effect depends mainly on the profiling of the section of the moulding, which should be most carefully considered. Mouldings form a very important element in architectural design. Their character is much influenced by the material in which they are to be executed; mouldings for marble will not do for stone, and those in wood must be different again. The finest mouldings have been produced by the Greek and the English Gothic architects, for marble and stone respectively; and next to these are those of the Italian architects of the Renaissance. Oriental nations have seldom produced good mouldings; they rely more on surface colour and elaborate, carved ornament.

MUTULES—Flat projections, closely spaced at equal distances, on the under side of the corona of the cornice of the Greek and Roman Doric Order. They serve to break up the line of shadow from the corona, and give a little incident to the soffit as seen on looking up.

MULLION—The vertical bars dividing up a Gothic window into separate lights.

NARTHEX—A shallow porch extending the whole width of the west end of a church; a common feature in early Christian churches, and occasionally met with in those of a later date. In the early church plan it probably arose out of the practice of having an atrium as a forecourt to the church; where there was not space for an atrium, the place of its eastern colonnade or arcade was taken by the narthex.

NAVE (from Greek *Naós*, a temple)—The principal part of the interior of the early Latin church, where in many cases it was in fact, the church, the eastern apse only being added to it. In the mediæval church, the longest compartment of the church, west of the crossing, to which alone the lay worshippers were admitted, and which was sometimes used as a separate church for their services. It is worth note that the plan and proportions of the nave in the mediæval church remain very much what they were in the Latin church; the mediæval development of the church plan was all in the eastern portion occupied by the clergy, the architectural plan thus reflecting the continued rise in importance of the clerical power.

OBELISK—A square pillar slightly tapering upwards, and with the angles rounded or canted inwards at the top to a central apex. It is an Egyptian form, and was phallic in its origin.

OPISTHODOMOS—Literally, the "back house"; a part of the interior of a Greek temple, shut off by a cross wall from the main temple, and having its own entrance doorway at the opposite end from the temple entrance (*see* the plan of the Parthenon on page 49). It was generally used as a treasure-house.

ORDER—In Classic architecture, the whole design of column and entablature, the different parts of which are all proportioned to one another; hence the term "Order" (*ordo*). The column by itself is not the order, though often inaccurately spoken of as such. The phrase "an order of columns" or "an order of pilasters" may, however, be pardonably used, as a matter of convenience, in describing a building.

In Gothic arches, the rings of voussoirs recessed back from the wall-plane are sometimes described as "orders" of the arch, for convenience. Thus an arch like that shown in Fig. 292 (page 160), with three rings of recessed voussoirs, is an arch of three orders of mouldings.

OVERSAILING—Courses of stone or brick projecting beyond the face of the wall below them are said to be oversailing.

PARAPET—A small wall erected for protection, as at the sides of bridges, and above the cornice of buildings, especially where there is a flat or low-pitched roof. In Renaissance architecture parapets are usually designed with open panels filled up by balusters. Gothic parapets are often richly decorated with open-work tracery or with carving in panels.

PEDIMENT—The triangular figure formed by the horizontal and the two raking cornices at the end of a Greek or Roman temple. With the Romans (possibly also with the Greeks) the pediment was considered to be a special appanage of the temples of the gods, and not permissable on private residences. From the Renaissance period the pediment came to be regarded as a kind of architectural "property," to be used on a small scale over doors and windows, as in the Farnese palace (page 236). This use of it has a good effect, though it must be admitted that it is quite illogical.

PENDENTIVE—The triangular domical erection by which the base of a circular dome is supported from the angles of a square substructure (*see* page 104).

PERSPECTIVE—The science of drawing objects on a flat plane so as to appear to have solidity; more especially, the science of setting up representations of objects already drawn in plan and elevation, as they would appear to the eye when viewed from a certain assumed point. It is a matter of pure science, and can be learned by rule, as far as the lines of the drawing are concerned; though the colouring or other treatment of the drawing, to render it effective, is the work of art.

PIER—In Gothic architecture, the built-up vertical erection from which the arch springs; distinguished from a column by the fact that it is not a simple cylindrical or octagonal shaft, but a collection of shafts and mouldings. People often speak of the "pillars" of a cathedral, which is a totally wrong expression; they are "piers."

"Pier" is also used to express the uninterrupted vertical masses of wall in any building, in contradistinction to the portions of the wall that are pierced with openings.

PILASTER—Strictly speaking, an imitation of the Classic column and capital in the form of a flat rectangular projection from a wall of which it forms, structurally, a portion. It is the essential character of a pilaster that

it forms part of the wall; a square column standing free is not a pilaster, it is a square column. A pilaster is often used as a kind of wall-echo of the columns ranging with it, and has the same base and capital in its front appearance, their mouldings being returned and stopped against the wall. Pilasters were often used by the Renaissance architects, and are constantly used in the present day, to plant upon the wall of a building as a means of giving it architectural dignity and expression; a result which it does in fact attain, when well designed, although the procedure is totally indefensible on grounds of architectural logic.

The term "pilaster" is also sometimes used, for convenience, to describe a wide flat projection from a wall, though it has no base or capital.

PILLAR—The same as *column*, when part of a building; perhaps pillar is a more suitable word to use when an object of that kind is set up as a memorial and not as part of a building, as implied in Matthew Arnold's well-known poem—

> "And plant a far-seen pillar over all,
> That I be not forgotten in my grave."

Both "pillar" and "column" are words of Latin origin (*pila* and *columna*).

PINNACLE—Used mostly of Gothic, and especially of the decorative finishes to buttresses, which are, in fact, intended as an additional weighting of the buttresses, treated in a decorative manner. Pinnacles are also often conspicuous as the angle finish to towers, especially in late Gothic. The word may apply to features of a similar kind in other styles.

PLINTH—A plain surface of masonry below the base moulding of a building, or a pedestal, or a column, which forms the base of the whole erection and connects it with the ground. Sometimes a plinth is formed, without any moulding, by slightly projecting it beyond the wall-plane above it.

PODIUM—A high basement to a temple or other building, having its own plinth, base-mould, and small cornice (called the "surbase"). Roman temples were frequently elevated on a podium, with a flight of steps at one end up to the entrance door. The special character of the podium is that it is a basement with a vertical face, in contradistinction to the stepped base of the Greek temple (*see* STYLOBATE). The podium has often been introduced in modern buildings in the Classic style, and adds much to the dignity of a large building. When the podium form of base is used only as a block square on plan, to support a column or statue, it then becomes a *pedestal*. A podium is the pedestal of a temple; a pedestal is the podium of a column or statue.

PORTICO—Properly applied to the colonnaded space in front of the entrance door to a Classic temple or other building in similar style; the central feature of the National Gallery, for instance, is a portico. The word is sometimes misapplied to a small erection which would be more properly called a porch. The expression "portico" need not be necessarily confined to Classic architecture; the front arches of Peterborough may be said to form a great Gothic portico; but the word implies something on a grand scale.

POSTICUM—The part of a temple which is behind the cella; practically the same as Opisthodomos; or it may be taken to mean the portico before the Opisthodomos.

PRINCIPAL—Short for "principal rafters"; the raking rafters which form part of the roof truss, and support the roofing. Sometimes the whole truss is referred to as the "principal."

PRONAOS—The portico of a temple in front of the naos or cella.

PTEROMA—In a peripteral temple (*see* page 62), the space between the colonnade and the flank wall of the cella.

PURLIN—Heavy timbers running lengthways in a timber roof, resting on the principal rafters, and supporting the smaller or "common rafters" on which the roof-covering is laid. The word applies equally to the similar members of a roof constructed of iron.

PYLON—Connected with Greek πύλη, a gate; generally used of the pyramidal masses of masonry flanking the entrance to an Egyptian temple. In modern times the word has been applied to decorative erections at each side of the entry to a bridge, as at the Alexandre III bridge at Paris.

PYRAMID—An erection, square or rectangular on plan, sloping on all sides from the base to a central apex. The typical examples are, of course, those of ancient Egypt.

QUADRIPARTITE—The name applied to the most simple form of cross vaulting, with two transverse and two diagonal ribs, dividing the plan of the vault into four triangular spaces.

QUOIN—From French *coin*, an angle; applied to large stones at the angle of a building, projecting somewhat beyond the main wall-plane. They are often rusticated to give them greater emphasis.

RAFTERS—The sloping beams which form the upper part of a roof. (*See* PRINCIPAL.) The principal rafters are placed at a considerable distance from each other, a distance partly determined by the substructure, as they must come over the parts of the wall intended to bear their weight. The "common rafters,"

much lighter pieces resting on the purlins carried by the principal rafters, are placed about 12 inches apart, and form the immediate support of the roof-covering. A "rafter" is always a raking piece, as a "joist" is always a horizontal one.

REBATE—A half sinking on the edge of a slab of any material, generally with the object of fitting a panel or a similar but reversed rebate into it.

REEDING—A simple form of surface ornament which may be best described as being the reverse of "fluting," leaving parallel convexities instead of parallel concavities.

REINFORCED CONCRETE—Otherwise called "concrete-steel" or "ferro-concrete" (though the latter term has been claimed as representing one special process). An entirely modern principle of construction, based on the fact that concrete is a material offering great resistance to compression but very inferior resistance to tension. The principle is, therefore, to embed steel rods or wires, or a steel construction of various linked members, in those portions of a concrete beam or pier which would be exposed to tensile stress, leaving the remainder of the concrete to resist compression stress. For instance, in the case of a beam carrying a heavy load, it is known that the upper portion of the beam is in compression and the lower portion in tension, and a beam of concrete would soon break under a central load from the inability of the lower portion to hold together. Consequently, steel is introduced in the lower portion, which resists the tensile strain. The methods of construction are various and often complicated, but the principle in all is the same—to supplement concrete with steel where it would be otherwise weak; and it has been found that concrete, provided it is well made and impervious to air, is a complete preservative of the embedded steel. The development of reinforced concrete has had an immense effect on utilitarian construction, enabling walls to be securely built of far less thickness than before (*see* footnote, page 85); but whether any high class of artistic architecture can be produced with it seems doubtful; from that point of view it seems too intractable a material.

RELIEVING ARCH—An arch built into a wall, above a lintel or window-head, to throw the weight of the upper part of the wall off the lintel, which then has only to support the part of the wall between it and the arch.

RIDGE RIB—In Gothic vaulting, a moulded rib running longitudinally along the central apex of the vault. It was seldom introduced in French vaulting, but is almost universal in English complete Gothic.

ROCOCO—Much the same as "Baroque"; a tawdry and florid manner of design in Renaissance architecture. It has no claim to be called a style.

RUSTICATION—A method of producing an effect of strength in a building by deeply channelling or otherwise emphasising the joints of the masonry, with the addition often of a roughened treatment of the surface of the stone, or even leaving it with a rock-like surface projecting beyond the main wall line. It is more used in Renaissance work than in any other phase of architecture. When only the lower portion of a building is rusticated, the rustication should always appear as an added thickness of wall, not as a mere cutting into the wall between the stones, otherwise the effect would be that of weakness rather than of additional strength. Rustication is also frequently used to give an additional appearance of strength to the angle stones ("quoins") of a building.

SCALE—A most important quality in architectural design, though difficult to define. It signifies a kind of proportionate relation between the parts and details of a building, so that they all seem to be designed with reference to some governing standard of proportion. A moulding or an ornament which looks as if it were too small or too large for its position—in other words, as if it came from some smaller or larger building, is said to be out of scale. In Greek buildings the proportionate scale of the details was most carefully considered, hence their value for study in this respect.

Scale also signifies the size to which a plan or elevation is drawn, in comparison with actual size. It is generally expressed in terms of the relation of an inch or part of an inch to a foot; thus, an "eighth-inch scale" means a scale of an eighth of an inch to a foot; a half-inch scale is half an inch to the foot. The scale to which a drawing is made should always be represented on it by a drawing of the scale, not merely named in writing, which is often inconvenient when no scale measure is at hand.

SCENA—Greek σκηνή: literally "a shelter," a covered place; but used to signify the permanent erection in a Roman theatre, forming the back-scene to the stage. There was probably something similar in the Greek theatre, but there are no remains.

SCHOLA—A form of small meeting-hall in Roman cities of the early centuries A.D., for business or other purposes, often with an apse at one end of it: possibly one suggestion of the plan of the early Christian churches (*see* BASILICA CHURCH).

SECTION—A method of representing the interior structure of a building as if a vertical cut was made through it and the part

nearest to the spectator removed. It is the complement of *plan*: the plan of a building is a horizontal cut through the building, with the part above the cut removed; the section is a vertical cut through the building, with the part on the nearer side of the cut removed. The section and plan together give the complete internal structure of the portion dealt with; in the case of a large and complicated building several sections would be required, as well as a plan of each floor. It is usual to mark in dotted lines on the plan the points at which the sections are taken: "section at A-B," "section at C-D," &c. Similarly, in details, *plan* is always horizontal, *section* vertical. A horizontal cut through an upright pier gives the *plan* of the pier; a vertical cut through the mouldings of an arch gives the *section* of the arch.

SEGMENT—Of a circle; any part of a circle less than a semicircle.

SEGMENTAL ARCH—Any round-headed arch which forms less than a semicircle, *i.e.* is only a segment of a circle. It is used also to signify a form of pointed arch ("segmental pointed arch") in which the triangle formed by the two points of springing and the apex would be included in a segment of a circle. The springing of a segmental arch makes an angle at the junction with the pier or support, instead of starting perpendicularly from it.

SEXPARTITE—In Gothic vaulting: the Quadripartite vault with an extra vaulting-rib springing from the centre of the wall on each side of the vaulting compartment, thus dividing the plan of the vault into six instead of four triangular spaces. It was introduced both in France and England in the Transitional period, with the view of strengthening the Quadripartite vault; but it has an awkward appearance in execution, and was soon abandoned (*see* plan and sketch, page 169).

SGRAFFITO—A form of wall decoration produced by laying a thin layer of white or light coloured plaster over a black or dark one, and then removing portions of the thin upper layer so as to produce a design in black and white, or in light and dark tints. It can be done either by removing the upper layer of plaster in the interspaces, leaving the design light on a dark ground; or by removing the portions of the upper layer forming the design, so as to show it in dark with light interspaces. The former is the most effective method.

SHAFT—Used to characterise the long thin quasi-columns common in Gothic architecture. It is also used of the main portion of a Classic column, as distinct from the base and capital.

SOFFIT—Italian *soffita*: generally speaking, the under side of any architectural member, such as a beam or arch. It is not applied to large surfaces; a ceiling, for instance, is not a soffit. It is more specially used of the under side of the corona of a cornice. The soffit of the corona is often elaborately decorated.

SPANDREL—The approximately triangular space left between the extrados of an arch and any horizontal boundary line immediately above the crown of the arch. It is frequently a field for decoration, especially with relief sculpture.

SPIRE—Anglo-Saxon *spir*: a lofty pointed termination to a tower; essentially and originally a form of pointed roof, though in the fully developed spire all idea of a roof has disappeared; and it is difficult to say at what point a roof ceases to be merely a high roof and comes under the definition of a spire. The spire is used most largely in Gothic architecture, and in complete Gothic is always octagonal on plan, though square spires are frequent in Romanesque architecture, especially in north Germany. The fully developed octagonal Gothic spire may be classed under two main forms: those which spring visibly from the outer edge of the tower, the angle faces being filled up with "broaches" (*see* illustration, Fig. 429), and those (generally of later date) which start from a base narrower than the tower, the junction with the tower being masked by parapets and angle pinnacles. The line of a Gothic spire is often broken very picturesquely by lucarnes with their small gables, but it is an essential quality of a spire that its main lines are continuous to the apex: the word "spire" is sometimes inaccurately applied to a tower built in diminishing stages; that is not a spire but a steeple.

STELE (Greek *στήλη*)—An upright stone, generally in column or obelisk form; not used to support anything, unless it may carry a bust or an urn, or other symbol. It is usually a memorial of some kind.

STORY-POST—An upright vertical support in a wooden structure; it might be called a wooden column, but that it has no capital and is generally square on plan. The name seems originally to denote a wooden support to an upper-story floor.

STRING-COURSE—A moulding run horizontally along a wall, to mark a division in the vertical spacing of an architectural design; sometimes used as an exterior indication of an interior division of stories, or run along beneath or between a series of windows or other openings to give them architectural connection. Very largely used in Gothic architecture, in which towers are often divided up into stories in this manner.

STRUT—In a wooden roof, a raking piece of timber, always in compression, to give

support to some special point in the construction. In general, any raking piece of timber used as a support or to resist thrust would be called a strut. The word is equally applicable to iron construction.

Stylobate (a Greek compound of *στῦλοδ βάσις*: The base of the columns)—Specially used of the base on which the columns of a Doric temple rest, which is always stepped, generally in three steps, the columns resting on the upper step. In this sense the difference between a stylobate and a podium is that the former is stepped and the latter is a vertical wall. Stylobate is, however, sometimes used to imply any continuous base to a row of columns.

Surbase—The small cornice to the top of a podium or pedestal.

Telamones (plural of "Telamon")—Male figures used as supports of an entablature, in Classic architecture, in place of columns or pilasters. Sometimes called *Atlantes* (plural of "Atlas").

Tepidarium—The great hall, maintained apparently at a slightly warm temperature, in the Roman Thermæ.

Thermæ—Literally "warm" (Greek *θερμὰ ὕδατα*—warm springs), but used as a title for the whole of a vast Roman bath establishment, with its cold, tepid, and hot baths, exercising grounds, libraries, lecture-rooms, porticos, &c. (*see* plan of one of them, page 92).

Tholos (Greek *θόλος*)—A general name for a circular building in Greek architecture; adopted also by Vitruvius in its Latin form (*Tholus*), apparently for a circular temple with a dome over it. The few circular buildings of the Greeks, however, of which there are any remains, were certainly not temples, nor were they roofed with domes.

Tie-Beam—In a roof-truss, the large horizontal beam which rests at each end on the walls, and confines the thrust of the principal rafters, the feet of which are partially let into it.

Tie-Rod—The same in an iron roof as the tie-beam in a wooden roof. Sometimes iron tie-rods are used in the construction of an otherwise wooden roof (as this member acts entirely by tension iron is perfectly efficient in a structural sense); but where they are thus used it is generally in wooden roofs which are not of the typical and strongest truss construction, and in which it is desired to have a tie at the feet of the principals which will not be too prominent and heavy in appearance.

Torus—A bold rounded moulding, convex in section, much used in the bases of the columns in Classical architecture, where it is generally contrasted with a *cavetto* or concave moulding (see the illustration of the base of the Erechtheion column, page 63, where there are two torus mouldings, the upper one worked with a surface ornament).

Tracery—In Gothic architecture, the stone framing in the head of a window, treated as a decorative design springing from and supported by the mullions. The earlier forms of tracery were entirely made up of geometrical figures, such as circles and curvilinear triangles, fitted together and butted against each other; hence called geometrical tracery. In later Gothic the tracery bars assumed a greater freedom and flow of line, the attention of the designer being concentrated on the bars of the design, and the openings left to come as they would. From a stained-glass point of view it was in this sense inferior to the geometrical tracery, as in the latter the openings as well as the bars assumed well-defined forms. Tracery was also used on a small scale as the decoration of panels in stone or wood, either pierced or with the bars in relief only. Tracery is used, in very elaborate designs of minute detail, in Byzantine and in Saracenic architecture; but though the effect of these is very rich, the design is more mechanical and less deliberately thought out than in Gothic architecture. One of the great architectural advantages of traceried windows is that they carry the wall-surface, in a sense, over the windows, instead of leaving them only as blank openings in the wall.

Transom—The horizontal division bars in late Gothic traceried windows, inserted at right angles to the mullions.

Transverse Rib—In vaulting, a rib that crosses the roof at right angles to the walls.

Triforium—In Gothic architecture, an arcade occupying, on the inside of the nave walls, the space between the top of the nave arcade and the sills of the clearstory windows. It is essentially a decorative treatment of the part of the wall against which the aisle roof abuts, and where there can therefore be no windows. It is generally deep enough to leave a practicable passage between the shafts which carry its arches and the wall behind them, a passage rendered continuous by narrow openings through the main piers which support the vaulting. Occasionally the triforium arches are left quite open into the space between the wooden roof of the aisle and the aisle vault, which has a flat floor on the top of it, forming a wide gallery; but the more general arrangement is for it to be walled up behind.

Triglyphs (Greek *τρίγλυφος* "thrice slit")—Upright blocks placed at regular intervals on the architrave in the Doric Order, and supporting the cornice, leaving square spaces

(" metopes ") between them. They were decorated with two vertical grooves on the face and a half-groove at each angle ; hence the name.

TRUSS—A method of framing timber or iron, with compensating strains in tension and compression, so as to render the whole construction self-supporting.

TYMPANUM—The triangular space left between the horizontal and raking cornices of a pediment in Classic architecture ; generally occupied by sculpture in the round, standing free of the wall behind it.

VAULT—In a general sense, any solidly built arched roof over a building, with the exception of a dome (which is, in fact, a form of vault, but is not generally called by that name). More especially, the form of built roof arising in the first instance from the intersection of two arched vaults at right angles, and subsequently, in Gothic architecture, developing into an arrangement of built-up ribs which form the real construction, the intervening spaces being filled in with lighter masonry supported by the ribs.

VAULTING-RIB—The moulded arched ribs which form the *nervure* of a Gothic vault ; the same as " groin-ribs."

VAULTING-SURFACES—The filling in between the ribs of a Gothic vault ; sometimes called the " web " of the vault.

VESTIBULE—An entrance hall or lobby within the main walls of a building, in contra-distinction to a portico or porch, which is outside of the main wall.

VOLUTES—The spiral ornaments on each side of an Ionic capital.

VOUSSOIR—The wedge-shaped stones of which an arch is built.

WAGGON-VAULT—The same as barrel-vault ; the name apparently suggested by the idea that it resembles the tilt of a covered waggon.

WALL-ARCADE—A blank arcade formed on the surface of a wall as an architectural decoration.

WALL-PLANE—The general surface of a wall, independent of special projections. It is an expression useful as affording a basis to measure from in defining any projection, as so many inches or feet " from the wall plane."

WALL-RIB—In a compartment of Gothic vaulting, a half-rib worked as part of the wall, necessary to complete the design, but having no structural function.

WALL-SHAFT—In Gothic architecture, a half or three-quarter shaft projecting from the wall but forming part of its masonry, its value being expressive and not constructive. It is most often used to lead up to the springing of the vault.

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